Products finishing

FRED W. VOGEL, Editor

Volume 4 APRIL, 1940 Number 7

Published monthly by
Gardner Publications, Inc.
431 Main St.
Cincinnati, Ohio

●

DON G. GARDNER
President and
General Manager

●

JOHN M. KRINGS
Advertising Manager

GEORGE E. HAY
431 Main St., Cincinnati
Main 0182

G. M. FILLMORE
342 Madison Ave.
New York
Murray Hill 6-3899

GEORGE H. MEYERS
Tribune Tower, Chicago
Superior 2290

Member

CCA

Printed
in U. S. A.
Copyrighted

CONTENTS

Finishing Stove Parts 9
By C. C. HERMANN

Heat-Reactive Coatings and Methods of Applying Them.. 14
By ARCHIE J. WEITH

Things You Can't Get Along Without 32

Metal Coloring Theory and Practice—Part IV 34
By JOSEPH B. KUSHNER

Architectural Porcelain Enamels for Interiors 44

Barrel Finishing of Metal Products 50
By H. LEROY BEAVER

The Finishing Forum 56

Finishes That Aid in Appearance and Utility 60

News of Industry 62

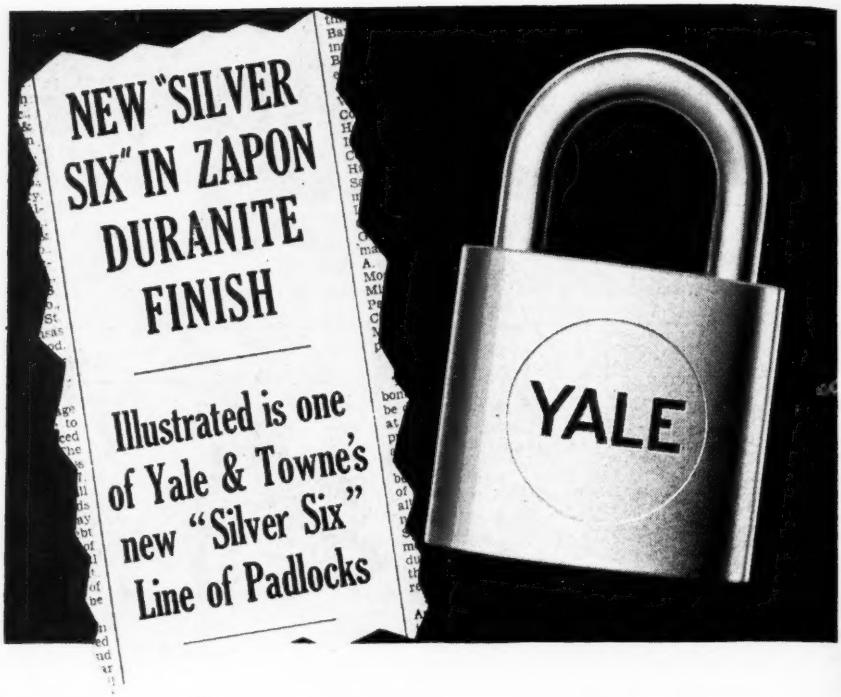
New Plant Equipment and Materials 66

Opportunity Section 77

For Your Catalog Library 78

Index to Advertisements 80

More Than 15,000 Circulation This Issue



This spring, in thousands of hardware stores throughout the country, customers will eagerly admire the newly launched "Silver Six" line of padlocks made by Yale & Towne. And the remarkable finish that gives them their name is S-277 Duranite.

A thorough study was made by Yale & Towne of S-277 to make sure it would stand up against all the conditions to which such a utility item as a padlock is subjected. After extensive tests for resistance to salt spray, humidity and abrasion, and also careful consideration of the very important factor of costs, S-277 "got the job."

It will be worth while to stop at your hardware store and get one of these handsome locks, look it over carefully and then subject it to tests. You will then appreciate the qualities of durability and beauty that appealed to the padlock manufacturer.

DURANITE—Trade Mark

EASTERN SALES:
ZAPON DIVISION
ATLAS POWDER COMPANY
Stamford, Conn.

ZAPON

WESTERN SALES:
ZAPON-BREVOLITE DIVISION
ATLAS POWDER COMPANY
North Chicago, Ill.

INDUSTRIAL FINISHES

PRODUCTS finishing

CINCINNATI, OHIO VOL. 4, NO. 7

APRIL, 1940

FINISHING STOVE PARTS

By C. C. HERMANN

THE maintenance and confinement of fire for domestic purposes has been a necessity to man since the days when — if we may believe Charles Lamb — an oriental's house burned down and he thus became introduced to the delicious flavor of roast pig. With the development of porcelain in Europe, this material was used to some extent in the fabrication of elaborate and expensive stoves for heating purposes, but in America the stove through the years and up until recent times has been used strictly as utility equipment, impossible of beautification further than the application of a small amount of nickel plating and frequent use of black stove polish.

With the development of colored enamels, the past few decades have witnessed a change in the appearance of American heating and cooking equipment. The black, unattractive stove has given away to the modern, brightly colored, interesting looking range which is available in any color to match the kitchen color scheme. The modern housewife has become accustomed to looking for

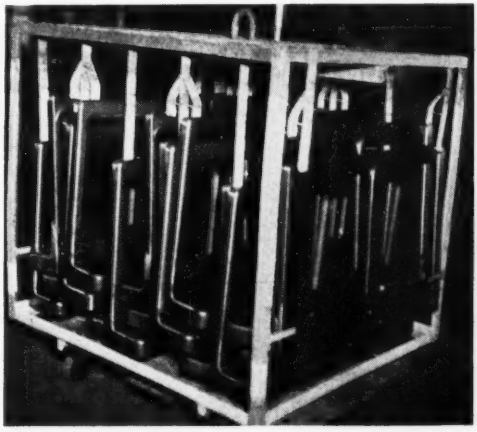


Fig. 1—Special holding fixture designed for holding stove tops

bright colors and attractive lines in her kitchen equipment just as she has in selecting furniture for the rest of the house.

Stove manufacturers have been quick to recognize the possibilities of modern finishes as applied to the stove, and especially is this true of Roberts and Mander Company, located at Hatboro, Pa. For the past sixty years, this company has been improving and increasing the production of stoves until today a production capacity of 80,000 units per year is possible.

The most important step in the production of the range is the care and attention given to the base metal during fabrication and first fabrication operations. The sheet metal parts for the stove are cut, formed, and welded together before they are transferred to the cleaning department.

Special racks have been designed by the engineer of this company to convey the parts through the cleaning operations. Figure 1 shows a view of a specially designed fixture for holding stove tops. This fixture is designed to fit on the top of a flat bottom, caster wheeled truck which has sufficient clearance underneath to permit the platform of an electric lift truck to pass beneath. Spacers are provided in some of the racks to keep some of the parts separated during the cleaning cycle. The loaded racks are moved between the parts storage cleaning and pickling room as shown in Figure 2.

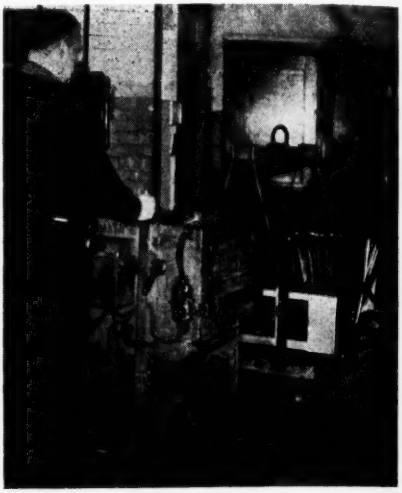


Fig. 2—The work holding fixture is conveyed to the cleaning department by means of the electric truck as shown in this illustration.

During the forming operations, a certain amount of oil, grease, and dirt accumulates on the surface which must be removed if a satisfactory adhesion of finishing material is to be

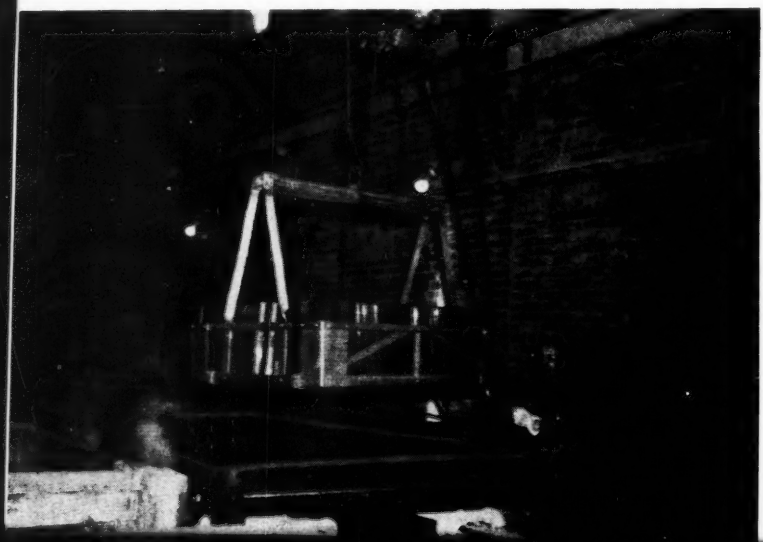


Fig. 3—General view of the cleaning and pickling department

obtained. The fabricated parts are thoroughly washed before they are conveyed to the cleaning department.

Figure 3 shows a view of the cleaning department where the fabricated workpieces are subjected to acid pickling solutions. The workmen in this illustration can be seen removing a rack load of work from an alkaline cleaning solution. The overhead crane serves to transfer the rack load from one tank to another through the cleaning and pickling operations. After the workpieces have been dipped into an alkaline cleaning solution, they are rinsed in warm water at 180 degs. F. and this is followed by cold water rinse.

Following the cold water rinse, the rack of work is placed in a seven per cent sulfuric acid bath which is maintained at 165 degs. F. The work remains in this tank from five to nine minutes and is then removed and rinsed with cold water.

A nickeling operation follows in which the workpieces are placed in a one per cent nickel solution maintained at 165 degs. F., where it remains for a period of from four to five minutes. The workpieces are thoroughly rinsed after they are removed from the nickeling operation. The last solution in which workpieces are placed while in the department shown in Fig. 3 is the borax and soda neutralizer solution. The solution is maintained at 190 degs. F. and the workpieces remain in the solution for a period of two minutes after which they are removed and placed in the dryer shown in Figure 4.

The dryer illustrated in Fig. 4 has a capacity of 700 pieces or seven racks of 100 pieces each per hour. After the dried work emerges from the oven it is placed on lift trucks and conveyed to the dipping tanks in the enameling department. After the workpieces are dipped into the enameling tanks, they are hung on the conveyor in the manner shown in Fig. 5. As shown in the illustration, the conveyor is provided with special fixtures for holding the workpieces as they travel along. The holding fixtures are designed to hold the work at an angle which will permit excess enamel to drain and thus provide uniform coverage.

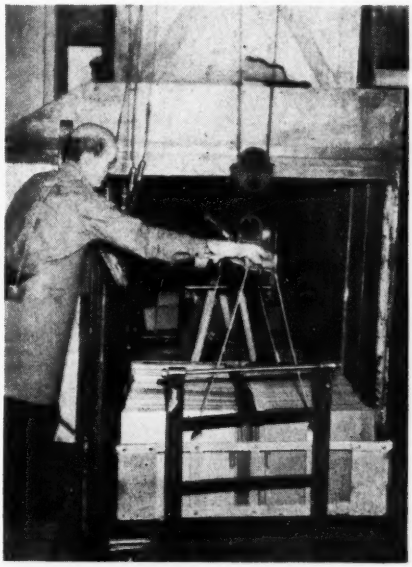


Fig. 4—A view of the dryer is shown in this illustration.

The conveyor shown in Fig. 5 is of special design and constructed on four inch standard I beams on which operate ball bearing rollers spaced every eight inches on forged steel chain links. The conveyor travels approximately three feet per minute.

The pickling operations to which the workpieces have been subjected has etched the metal surface. The etched surface provides a good bond for finishing materials, since the enamel will flow into the intertices. With this type of treatment, the finished job will withstand wide varia-

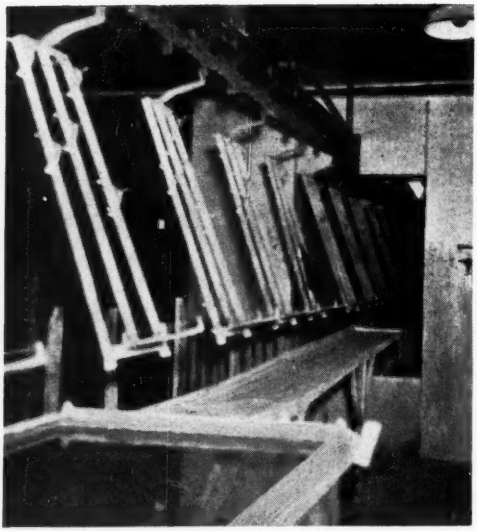


Fig. 5—An overhead conveyor is used to carry the dipped enamel workpieces into the oven.

mottled appearance of the finish is applied by spraying different color materials over the surface of the work, the work is laid flat on a three cable conveyor. The operators are located along one side of the conveyor and spray the work as it passes in front of them.

Figure 6 shows a view of the finished product leaving the assembly line. At this point it is inspected and then passed on to the crating and shipping department.

tions in temperature as well as average abuse.

Several other methods have been evolved for handling the workpieces between the various stages of finishing application. The enamel primer coat is applied with spray guns in a special section of the plant, after which the workpieces are carried into the baking oven where a temperature of 375 to 390 degs. F. is maintained. In other methods of finishing, for instance, where the

Mention PRODUCTS FINISHING when writing to advertisers. Your cooperation will be appreciated both by the advertiser and this magazine.

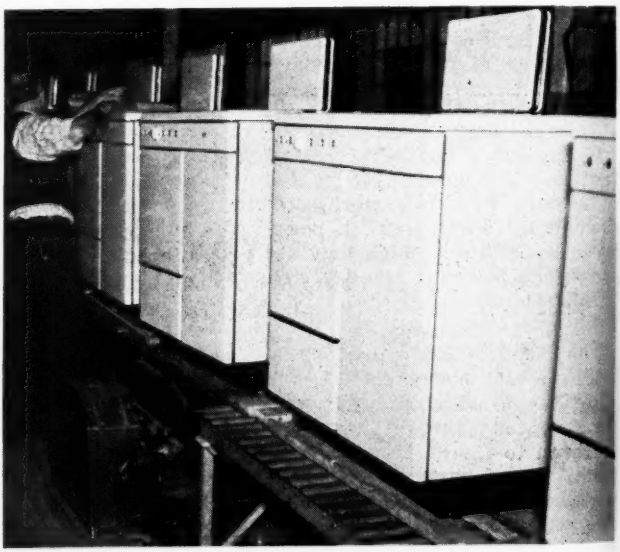


Fig. 6 — Illustration showing the conveyor line in the inspection department

What! WASH ALL SIX SIDES AT ONCE?

YOU wouldn't believe this washing machine (built for a large diesel motor manufacturer) could perform all the work it does—unless you could see it for yourself!

The problem was a tough one—"automatically wash chips and oil out of 150 to 160 holes of three different motor blocks on all sides simultaneously"! But Alvey-Ferguson Engineers solved it scientifically with this 3 in 1 machine that performs over 44 automatic operations!

Like this outstanding design, all Alvey-Ferguson Washing Machines have many unique features that it will pay you to investigate. Write today, without obligation, for information and advice on *your* problem.

THE ALVEY-FERGUSON CO.
202 DISNEY STREET CINCINNATI, OHIO

HAVE YOU A DIFFICULT Cleaning Problem?

Write today, without obligation, for new "Washing Machine Handbook and Engineers' Guide", with 20 helpful pages, profusely illustrated.

CONVEYING A-F MACHINERY

ALVEY-FERGUSON

Industrial Washing Machines

HEAT-REACTIVE COATINGS AND METHODS OF APPLYING THEM

By Archie J. Weith

Research and Development Department, Bakelite Corporation

WHEN Dr. L. H. Baekeland began serious work to adapt heat-reactive phenolic resins to practical commercial uses, he considered the protective coating field. Fortunately, brass beds tarnished easily and thus provided an immediate market for the new heat-reactive phenolic lacquers which in laboratory experiments had proved impervious to agents such as perspiration, alcohol, perfume, ammonia, disinfectants, and hot and cold water which sometimes attacked and destroyed other types of lacquers. Phenol-formaldehyde heat-reactive lacquers proved practical for the coating of brass surfaces.

This was only the beginning of commercial uses for heat-reactive

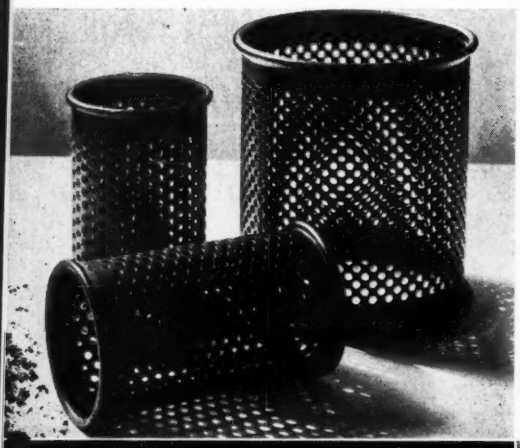


Fig. 1 (Left)—Textile spinning spools coated with heat-reactive finish.

Fig. 2 (Below, Left)—Interior view of a beer storage tank showing the glossy finish of a surface coated with a heat-reactive finish.

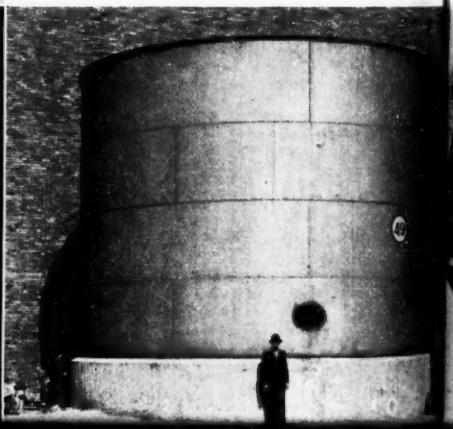


Fig. 3 (Below)—The inside surface of this beer well is coated.

Fig. 4 (Left) — The first heat-reactive coating lined tank car made in the United States to transport beer in bulk.

Fig. 5 (Right) — The interior lining of this tank car is baked by means of the portable heating unit shown in the foreground.

coatings, including varnishes, enamels and lacquers. It must be stated here that the phenolic finishes referred to must be hardened or polymerized by heat following application, after which they become permanently infusible and insoluble. The industrial importance of these products may be attributed solely to the chemical change. For comparison, the natural gum varnishes obtain their final properties largely by drying and oxidation in the air.

You probably ask at this point: "What are the special properties of heat-reactive coatings?" Briefly, here are outstanding qualities of phenolic lacquers:

1. When applied to metal they provide a hard, continuous, uniform protective coating.

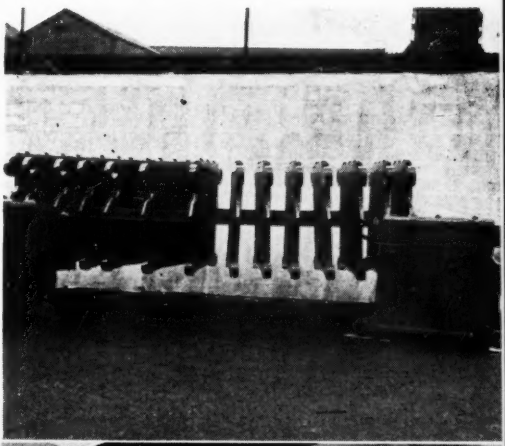
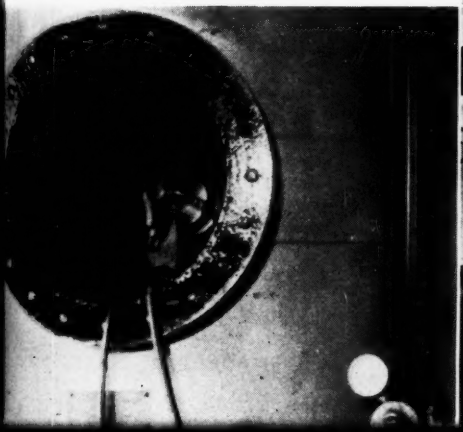
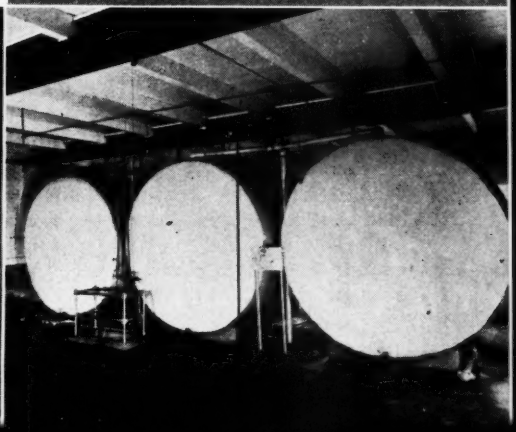


Fig. 6 (Below)—Wine process tanks such as the one shown herewith are being successfully coated by the Hastolite system.

Fig. 7 (Right)—Filter press plates for wine making equipment are coated with heat-reactive finishes.

Fig. 8 (Below, Right)—The milk tanks shown here have been coated with Lithcote.





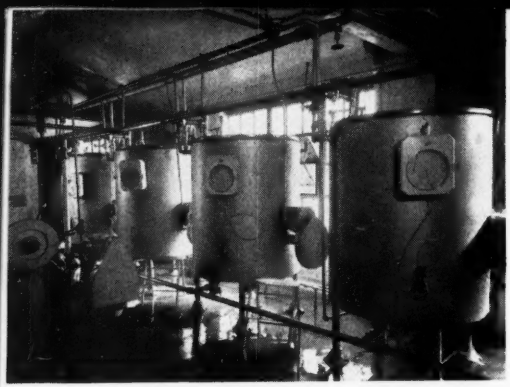


Fig. 9—Milk pasteurizing equipment is coated with Lithcote heat-reactive finish.

2. When applied to wood or porous ceramic material, they serve as impregnation or surface coatings.

3. They are excellent electrical insulators.

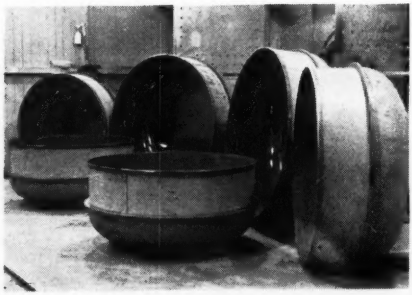


Fig. 10—Dough pans with Lithcote linings enable bakeries to maintain absolute cleanliness.

4. From a mechanical standpoint, they provide tenacious, durable bonds.

5. They are non-hygroscopic and remain unaffected by extremes of climate, temperature or humidity.

6. They will not deteriorate and are unaffected by water, alcohol, acetone, benzine or other common solvents, oils, greases, organic acids, dilute mineral acids and most soap lubricants. They retain these properties even at elevated temperatures.

7. Once converted to their final, durable state, they will not melt at any temperature and will not char at temperatures below 300 degs. F.

Heat-reactive coatings, as stated previously, must be baked on the surfaces to which they are applied. This immediately brings up the problem of baking equipment and methods of applying heat to polymerize them and bring them to their final hardened state.

At the time the new heat-reactive coatings were first commercially used, there was not very much of a problem in baking technique because they were used only for coating small articles such as door handles, hinges, escutcheson plates, small fittings, belt buckles, vanity cases, and somewhat later, safety razors, cigarette cases, clock cases and ash trays, and later, textile spinning spools as shown in Fig. 1, and paper wound tubes for textile yarns. The coatings have also been used for the impregnation of

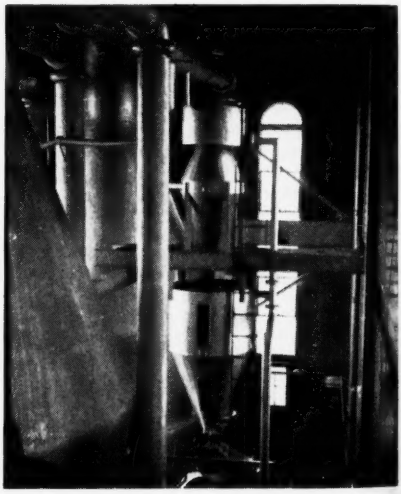
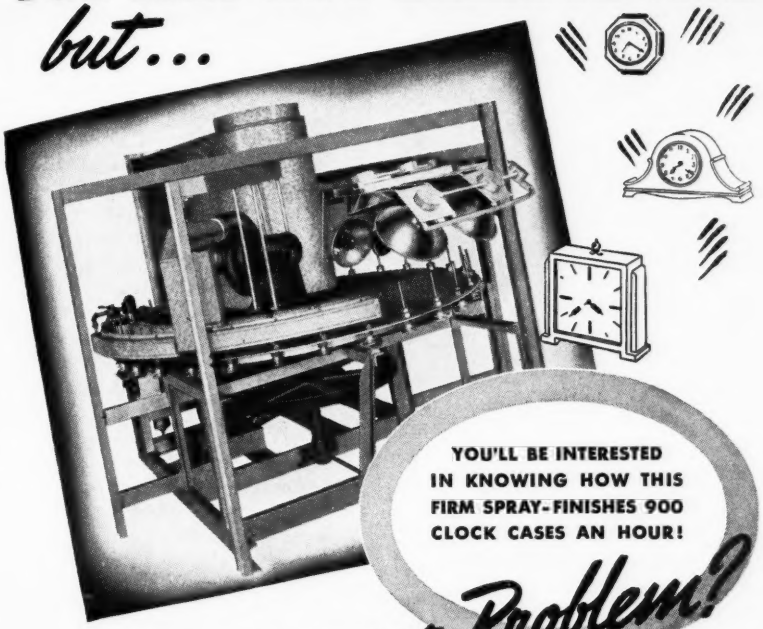


Fig. 11—Ventilation fans and ducts are protected with heat-reactive finishes.

YOU MAY NOT MAKE CLOCKS *but...*



YOU'LL BE INTERESTED IN KNOWING HOW THIS FIRM SPRAY-FINISHES 900 CLOCK CASES AN HOUR!

What's your Problem?

● Time is important in that plant. Its product measures time. Its costs are based on time. Saving time in spray-finishing odd-shaped clock cases was a problem—until a DeVilbiss Spray Specialist was called in for recommendations.

DeVilbiss Automatic Spray Equipment was the solution—and look at the amazing results that DeVilbiss engineers produced. Product finishing was increased to 900 clock cases an hour, the finish baked in an infra-red ray oven and hardened in a cooling tunnel—all within a floor space not much larger than the top of your desk.

This is just one of hundreds of spray-finishing problems that have been solved with most profitable results by the many specialized types of DeVilbiss Automatic Machines. Find out what they can do for you. Call the DeVilbiss representative today.

THE DEVILBISS COMPANY • TOLEDO, OHIO

Canadian Plant: WINDSOR, ONTARIO

DE VILBISS SPRAY SYSTEMS

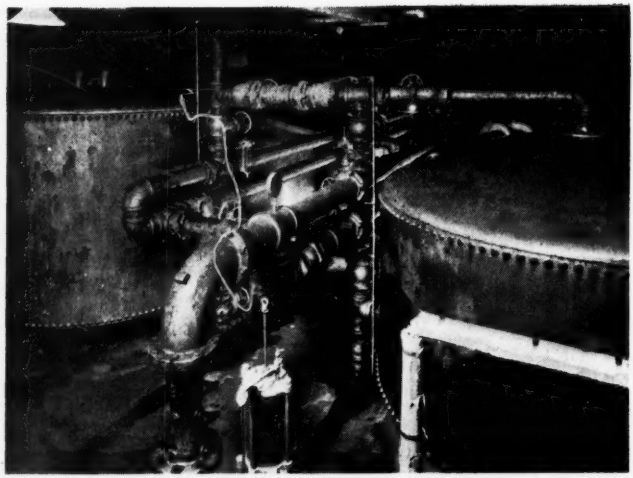


Fig. 12—Water purification systems and tanks coated with heat-reactive finishes resist the corrosive effects of contaminated water.

coils and armatures. From the very beginning, industry showed a great deal of interest in the use of these protective coatings for large industrial equipment. About 1914 the new steel Pullman railway car was suggested as an interesting application. However, no one could be induced to invest in an oven large enough to heat a finished railway car and thus, practice had to wait for the development of suitable equipment. Since the first dreams of baking full-sized Pullman cars, the proper equipment and the proper heating technique have been made available. Now, full cars and even trains and ships can be coated and baked.

In the past fifteen years, heat-reactive coatings have been improved. Their flexibility is greater, and at the same time baking temperatures have been lowered by about 25 per cent. Advance is continuing and shortly there will be released even newer heat-reactive coatings which will lower the critical heat-hardeneing range again by some 25 per cent. Laboratory materials are already under test which are converted by heat at 160 degs. F.

Recent advances in the coating of large industrial equipment such as tanks, textile processing machinery, food equipment and chemical equipment again either chemical attack or mechanical wear involve many factors, particularly proper equipment and proper handling technique. This art is extremely complicated and it has been developed by several specialists in the industry notably the Lithgow Corporation and the Hastolite Chemical Corporation and Bishopric Products Company, Inc. These organizations specialize in testing various types of coating materials and evolving formulations for specific applications to bring out desired properties. They conduct accelerated

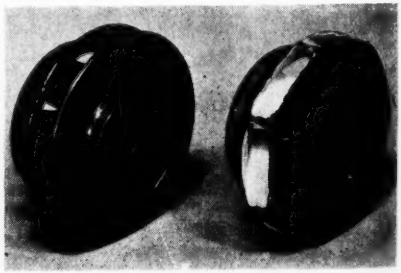


Fig. 13—The centrifugal pump impeller shown at the left was coated by means of the Lithcote system. The impeller at the right was untreated. Both were then subjected to identical treatment.

★ Used and Preferred by
METAL INDUSTRY

Ewing Galloway, N. Y.

The dependable qualities of this famous line of adhesive tapes are recognized by expert metal finishers.

For general protection of parts and polished surfaces, for masking purposes, striping and many other important uses.

Our laboratory offers full cooperation on any special tape problem, without obligation

INDUSTRIAL TAPE CORPORATION
NEW BRUNSWICK, N. J.

★**PERMACEL**
The Paper Backed Tape

★**JONFLEX**
Fine Cloth Tape

★**INDUSTRIAL**
Coarse Cloth Tape

★**UTILITAPE**
Waterproof Cloth Tape in Standard Colors

ELECTAPE
With Flexible Bakelite Coating

★**METACEL**
Metal Foil Backed Tape

TEXCEL
Transparent Tape

•

Samples on request

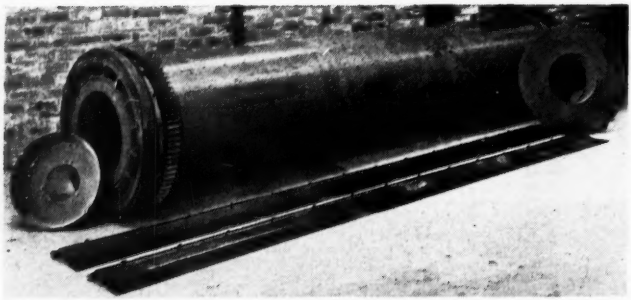


Fig. 14 — Illustration showing a rotary salt dryer of the type used in salt mines. This unit was Lith-cote treated.

tests and have accumulated within the past six years a mass of data and experience on the many problems involved in coatings and in baking technique for each application.

Finishing engineers have coated some very interesting equipment in the field by way of protecting beer, wine and distillery equipment, food processing equipment, and chemical, electrical and industrial equipment. These applications have been made possible because special types of portable equipment have been designed, thus making it practical to coat and bake equipment already assembled in plants. The special equipment overcomes the limitation and impracticabilities of transporting fixed processing equipment to a central plant for coating and baking.

Breweries, wineries and distilleries are confronted with problems of corrosion from fermentation, fruit acids and other chemicals, which manifest themselves in processing equipment and, of course, in transportation of alcoholic beverages. Figure 2 shows the interior of a beer storage tank with its glossy surface coated with a special heat-reactive finish. Formerly, tanks of this kind have been pitch lined. The tanks, when protected with a synthetic heat-reactive coating, have been used both for beer storage and intermediate fermentation products with excellent results. In many cases, the tanks have to be coated and the films baked on in cellars where the temperature must be maintained between 32 degs. and 40 degs. F. in order to protect beer in adjacent tanks. After application has been completed, the protective coating is subjected to normal operating temperatures. In a number of instances,

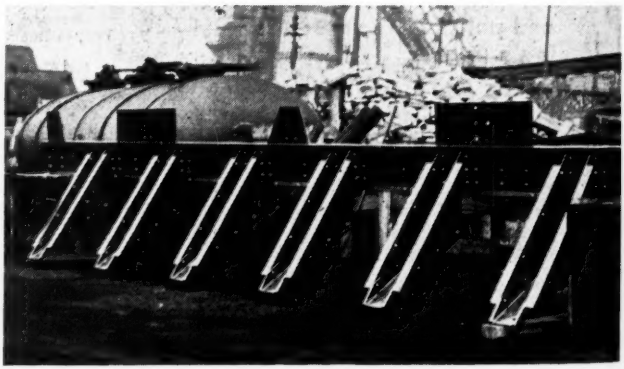


Fig. 15 — This steel framework of a transport car used in quenching coke is coated with a heat-reactive finish so that it will resist ammonia, salt water, and heat.

Here's a "new wrinkle" in WRINKLE FINISH!

● Are you having trouble getting a good wrinkle finish, because you're trying to use some "standard formula" that doesn't fit your operating requirements?

Glidden Wrinkle Finish never fails to give perfect service, because Glidden *fits the formula to the plant.*

Glidden puts a trained engineer in your finishing department to study your equipment—ovens, circulating system, guns, baking schedules. From these facts, Glidden develops a formula in which types, proportions and viscosity of oils and pigments are exactly suited to your working methods.

That's why Glidden Wrinkle Finish produces any desired surface from fine dull suede to coarse wrinkles of conventional design and pine-tree effects, in any color, always free from "fish-eyes" and other defects. That's why it gives superb mileage and is less sensitive to heat variations. Applied on bare metal, it is mar-proof, tough, elastic.

Try this "new wrinkle!" Have your "wrinkles" tailor-made by Glidden.

THE GLIDDEN COMPANY

National Headquarters, Cleveland, Ohio

Factories or Branches in Principal Cities

Reg. U. S. Pat. Off.
TIME-TESTED
GLIDDEN PRODUCTS CARRY THIS FAMOUS MARK OF QUALITY

GLIDDEN

Everywhere on Everything

the coating has withstood occasional steam sterilizing at high temperatures without any adverse effect.

The cost of cleaning coated tanks under average brewing operation is only 30 per cent of the former cleaning cost, and due to the extremely smooth glossy surface which the new

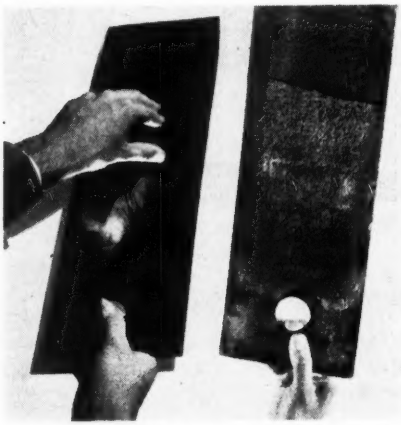


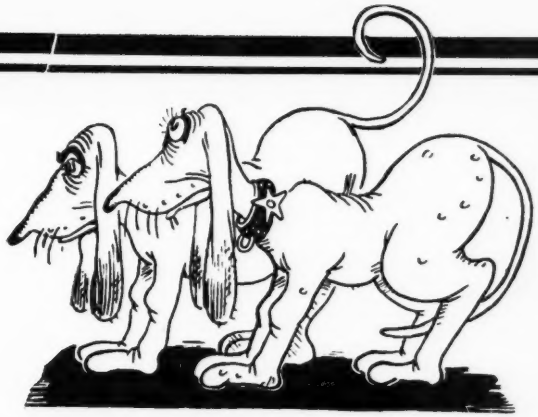
Fig. 16—These two test panels were alternately exposed to gasoline, hot salt water, and moist air for a period of two years.

coating provides, the need for the hypochlorite germicidal washout has been eliminated. Washing with hot water is the only requirement. The film is smooth, glossy, non-porous, hard, and yet tough enough to withstand metal distortion, such as encountered in tank cars railroad service. Figure 3 shows a view of a steel beer well used by a prominent distillery that has been similarly lined. The life expectancy of the coating is from seven to ten years without the necessity of retouching, when care is taken to avoid mechanical damage. The coating is resistant to acids and is unaffected by temperatures from 98 degs. to 180 degs. F. Formerly, the distillery used a concrete sump, but steel is far more satisfactory since it eliminates bacteria fermentation and can be easily sterilized and there is no scouring. The first tank car made in the United States to transport beer in bulk is shown in Fig. 4. The interior was coated with a heat-reactive film and at the time the photograph was taken, it had been in service for two years.

Figure 5 is a view showing a tank car on a railroad siding in the process of being baked in the interior with a Lithgow Corporation's portable furnace. The tanks must be protected against corrosion from all types of acids, and the coatings must withstand distortion from railroad shocks and loads. The Lithcote lining helps to prevent corrosion and enables liquids to be shipped in bulk, when previously liquids had to be shipped in small containers.

Wine process tanks such as the one shown in Fig. 6 are being successfully coated with heat-reactive finishes. In the wine industry, the coatings have been found to be suitable for lining tanks which contain 180 proof alcohol, distilled water, 80 proof brandy, whiskey and gin. The coatings not only withstand the solvent action of the alcohol but even professional wine tasters have been unable to note any foreign taste or color in the contents of the tanks.

The wine tank is coated by the Hastolite system. The reflection on the manhole face indicates the high gloss of the finish which has been applied. The operator may be seen inside the tank holding a low-pressure DeVilbiss spray gun. At the right, the large hose leads from a nitrogen tank and is used for spraying to eliminate fog and keep fire hazards to a minimum. The smaller hose supplies fresh air to the sprayer's helmet. The helmet is also equipped with an emergency respirator in



"Call off yo bloodhounds, Suh, an' we'll come down out 'a dis yer tree"

When you tire of being hounded by finishing problems that have you up a tree... we'll call off the dogs. The thousand-and-one technical problems inherent in YOUR finishing requirements are grist to the mill of the Stanley laboratories. Remember... the RIGHT answer to your finishing problem is far less expensive than the WRONG one. An inquiry may cut your finishing time, reduce your finishing cost, increase the salability of your product... and it incurs no obligation. Address Department F.

THE STANLEY CHEMICAL CO.

EAST BERLIN CONNECTICUT

Lacquers · Enamels · Synthetics · Japans

A SUBSIDIARY OF THE STANLEY WORKS. NEW BRITAIN, CONN.

the event the air line becomes fouled. The helmet and respirator are of a special design by Hastolite.

Figure 7 shows a view of filter press plates that are used in making wine. Previously, they were uncoated and had to be replaced frequently because the iron became contaminated from fruit acids. After being coated with Lithcote, the plates were acid-resistant. Furthermore, the cost of operation was reduced because of the ease with which they could be sterilized.

In the manufacture of food products, and in food processing, equipment must be kept free from contamination and be spotlessly clean. Bacteria and chemical agents are always a source of concern. Not very many years ago, equipment such as steep tanks could not be protected with a heat-reactive coating because there was no satisfactory means of baking the finish to its final, durable state. Steep water is a solution which varies from .01 to .04 per cent of sulphur dioxide content, and this is one of the most severe corrosive conditions that confronts the food products industry. As a rule, the weak sulphur dioxide in steep tanks eats its way through the cast iron shell very rapidly, leaving nothing but carbon which is contained in the iron. When the carbon is scraped out, the iron shells become thinner and thinner until the entire one-inch thickness of metal becomes porous. After the interior was Lithcote-lined, it was tested for one year and proved at the end of this time to be unaffected, whereas normally the cast iron had been worn away at least an eighth of an inch.

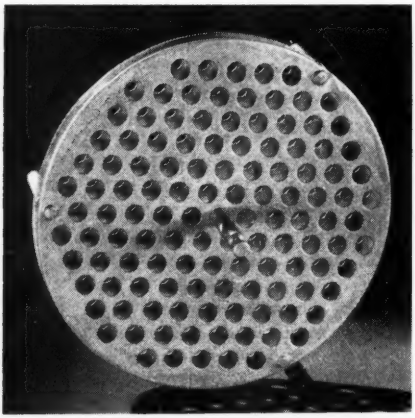


Fig. 17—Special aluminum trays such as the one shown here are coated with heat-reactive finishes to resist the attack of sulfuric acid vapors.

Milk tanks shown in Fig. 8 were coated with Lithcote and ten times the cost of replacement was saved. The tanks were out of service for four days each during the period that the coatings were applied. Figure 9 shows a view of several milk pasteurizers used in the same dairy. The conditions encountered were identical. Their operating temperature, however, is only 160 deg. F. as compared with 230 deg. F. for steam sterilizing the storage tanks.

Bakeries offer another illustration of an industry that operates under the most sanitary conditions. The dough pans shown in Fig. 10 are subjected to abrasion from paddles which are used to remove the dough. A Lithcote lining on these pans enables the bakery to maintain absolute cleanliness. In addition, there is no loss from dough contamination by iron.

Coatings for Chemical and Corrosion Resistance

Some of the industrial equipment that has been protected with heat-reactive finishes include ventilation fans and ducts, water purification systems and tanks, and aluminum flasks for mailing delicate flavoring extracts. Illus-

PENNSALT CLEANER

ELIMINATES PRECLEANING, SAVING TIME AND FLOOR SPACE FOR RCA MANUFACTURING CO., INC.

● **In the finishing of radio chassis and other parts it is highly significant that the adoption of Pennsalt Cleaners enabled RCA to eliminate entirely a precleaning operation with no sacrifice in cleaning efficiency, and to gain 800 square feet of floor space formerly occupied by two conveyor type washing machines. The sale of the two machines relieved department overhead of their amortization burden.**

Case histories such as this suggest strongly that the Pennsalt Cleaners may offer great advantages in your own processes. Orthosil was the original heavy-duty cleaner in the Pennsalt line. Companion cleaners, meeting each need with laboratory precision, were developed for varied and extreme requirements.

They offer exceptional dissolving and emulsifying action; tremendous lasting power; and quick efficient cleaning ability. One or more Pennsalt Cleaners can earn a money-saving place in your processes. Why not make a test? Write Dept. F and we will furnish full details. Pennsalt Cleaner Division, Pennsylvania Salt Manufacturing Co., Philadelphia, Pa.

PENNSALT

CLEANERS FOR INDUSTRY

★ ★ ★

Other Pennsylvania Salt Chemical Products used in large quantity by industry

ANHYDROUS FERRIC CHLORIDE • SAL AMMONIAC • CARBON TETRACHLORIDE • SODA ASH • MINERAL ACIDS • CAUSTIC SODA • KRYOLITH • ACID-PROOF CEMENTS

PENNSYLVANIA SALT MANUFACTURING COMPANY

Chemicals

trations showing several of these items are designated as Figures 11 and 12. The centrifugal pump impellers shown in Fig. 13 have received identical treatment and the temperature involved is about 150 degs. F. and the impellers must resist sulfuric acid. The impeller shown at the left is in practically the same condition as when it was first coated by the

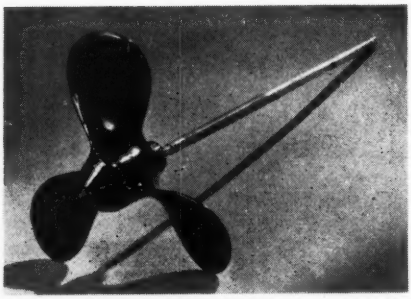


Fig. 18 — A miniature ship propeller coated with a Hastolite heat-reactive finish is used in the laboratory for test purposes.

Lithcote system, while the untreated impeller at the right is badly corroded.

A rotary salt dryer of the type used in salt mines is shown in Fig. 14. Corrosion had been terrific even though the dryers were made of expensive metals. The dryers shown are protected by Lithcote and constructed of less expensive metal.

Figure 15 shows a view of the steel framework of a transport car used in quenching coke. The conditions are very severe in that the protective coatings must resist ammonia, salt water and heat from flaming coke. Other applications are steam jacketed kettles, heat exchangers, sterilizing ampules, and pump and acid conveying pipe lines.

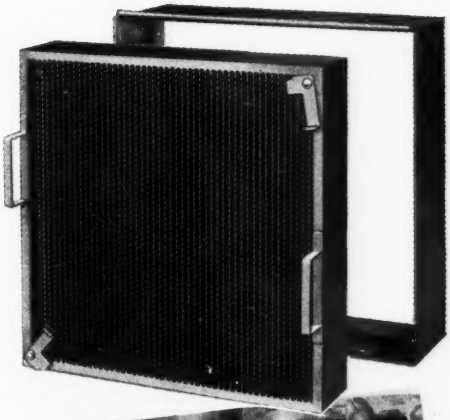
One of the most rigid tests to which the coating has been subjected is illustrated by the panel shown in Fig. 16. This panel, as illustrated on the left, together with many others coated with different systems, were exposed alternately for one week to gasoline, hot salt water (sea water) and moist air. Then the test was repeated week after week for two years. At the conclusion of the test, the resin coated surface was the only one that withstood the severe conditions. The left-hand illustration shows the coated face of the panel which has retained the original gloss and shows that there has been no attack on the steel plate underneath. On the right may be seen the untreated back of the same panel. Notice the rusting, pitting and scaling.

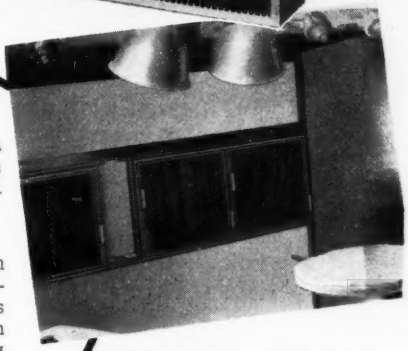
Vapors used to sterilize 10 cc serum ampules contain about one per cent sulfuric acid. Acid is added to eliminate all stains caused from handling the ampules with rubber gloves. The ampules are deposited in special aluminum trays. Ordinarily, the life of a tray such as the one shown in Fig. 17 is five days. Aluminum is usually selected because of its uniform heat conductivity from center edge which prevents cold spots in the ampules. The trays were coated by Hastolite with heat-hardened varnish and they have already been in service for three months without any harmful effects or breakdown in the coating.

The Agricultural Department of the State of New Jersey has been experimenting for some time in propagating a nematode parasite to combat the Japanese beetle. The nematode subsists on a menu of fermented Irish and sweet potatoes. A few years ago the Department found itself seriously handicapped by difficulties in protecting the culture trays from corrosion. This problem was over-

AMERICAN
AIR FILTERS
for Protecting
PRODUCT FINISHING

American Air Filters offer a simple and practical solution to many of the problems of product finishing. They are used in spray booths to control surplus spray—in compressed air lines to remove entrained oil, moisture and dirt—in finishing rooms, drying rooms and baking ovens to eliminate dust and dirt. *Write for Bulletin 244.*



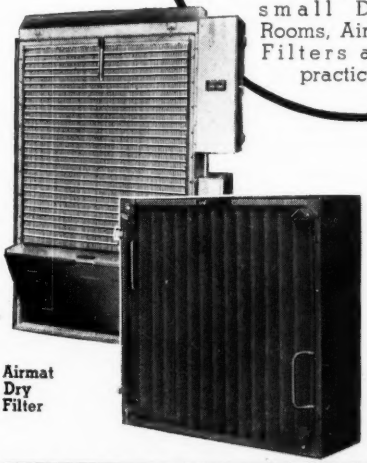


Sinuous Spray Booth Filter
Multi-Panel Filter

The Sinuous Spray Booth Filter consists of a cell and frame with a capacity of 1500 C.F.M.

●

For larger Drying Room Ventilation, the Multi-Panel Automatic Filter is recommended, while in small Drying Rooms, Airmat Dry Filters are most practical.



Airmat Dry Filter

Drying of such finishes as paint, enamel, varnishes, etc., may be accelerated by properly ventilating the drying room. Bringing filtered, warm air in contact with the finished surfaces and exhausting the fume laden air will materially lessen the drying time.

Write for Bulletins 230B and 240C.

AMERICAN AIR FILTER CO.
(INCORPORATED)
700 Central Avenue **Louisville, Ky.**

AIR FILTRATION AAF DUST CONTROL

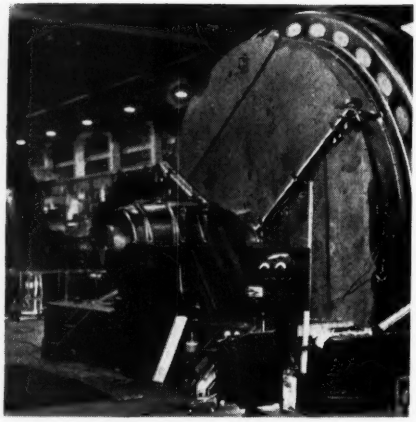


Fig. 19 — Generator winding insulated with heat-reactive varnish resists damage from moisture.

come by coating the trays with a heat-hardened enamel. Recently, it was reported that the trays have been in contant use for about three and one-half years and the majority are still in excellent condition. Previously, the trays had to be recoated every three weeks.

A highly convincing test of the resistance heat-reactive phenolic coatings have to salt water and abrasion was conducted in 1938 by the Hastolite Chemical Corporation. In this test, the miniature ship propeller, shown in Fig. 18, which had been coated with this type of varnish, was operated at five times normal speed. The tank was filled with sea water and abrasive particles. The test was made continuously for an estimated four-year period by an approved accelerated method. In addition, a constant voltage, which was impressed on the end of the uncoated shaft, wore out three shafts by electrolytic action during the test and would have entirely decomposed the propeller had there been the slightest failure in the coating. This illustration shows the propeller at the conclusion of the test. Note how the end of the shaft nearest the propeller is all but corroded through, yet, the propeller coating is in excellent condition, even retaining its original luster.

Already, the propellers of three transatlantic ships, two tankers and one steamer have been coated with Hastolite synthetic resin enamel. In addition, the propellers of two ships operating in Lake Maracaibo, Venezuela, have received similar protection. These propellers have been in use for one year in rancid water, oil film and decayed vegetation. After several months, other propellers had to be replaced, while the resin-coated propellers are still in good condition.

When the Niagara River receded from its disastrous flood in January, 1938, the equipment in the Ontario Power Company's plant of the Hydro-Electric Power Commission lay buried under 7,000 tons of ice. Of the fifteen huge generators in the plant, only two had been insulated with heat-reactive varnish and laminated phenolic material in the rotating field coils. The insulation of these two generators came through the ice flood without major damage, while other machines, employing older types of insulating materials, were so badly damaged that complete re-insulation was required. Due to the remarkable performance of the heat-reactive products in the two generators which survived the terrific punishment for a full month, they were specified for the re-insulation of the entire group of generators to insure assemblies that in future will withstand water, freezing, overheating and high mechanical stress. Illustration Fig. 19 shows the arrangement for vacuum drying the generators. The twenty-six-inch vacuum is in the final stages with a temperature of 195 degs. F.

GRINDING WELDS IS QUICK and EASY when you use SKILSAW DISC SANDERS

Toughest grinding or cleaning jobs are simple for SKILSAW DISC SANDER—it has a rush of power that saves considerable time and labor costs . . . does a much cleaner, smoother job with less effort! Engineered for speed and power, designed for comfort and ease in handling. Made in 3 models for every kind of grinding, sanding and polishing work — use them with cup grinding wheels (up to 6 in. diam.) wire brushes, polishing pads, etc. on flat, concave and convex surfaces of metal, wood, stone, marble, tile and compositions.

SKILSAW, INC.
4743 WINNEMAC AVENUE, CHICAGO

36 East 22nd St., New York • 182 Main St., Buffalo • 52 Brookline Ave., Boston • 15 S. 21st St., Philadelphia • 2124 Main St., Dallas • 918 Union Street, New Orleans • 1253 South Flower St., Los Angeles • 2065 Webster St., Oakland • 29 North Ave., N. W., Atlanta • Canadian Branch: 85 Deloraine Ave., Toronto.

Skilsaw Tools are sold by leading distributors of mine, mill, hardware and contractors' supplies.

SKILSAW
SAWS · BELT SANDERS · GRINDERS · BLOWERS
DRILLS · DISC SANDERS · FLOOR SANDERS
PORTABLE ELECTRIC TOOLS

SEE YOUR DISTRIBUTOR ...he will gladly demonstrate how SKILSAW TOOLS will save you money

And so, today, with improved heat-hardenable coatings, with newly developed portable equipment, and with special baking technique, we find small pieces and huge industrial equipment being protected from chemical agents and corrosion. Applications range in size from the small

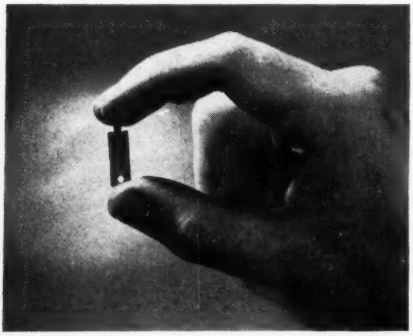


Fig. 20—Items as small as this steel part of a magnetic core are protected by means of heat-reactive finishes.

silicon steel piece, shown in Fig. 20, which is used in magnetic core construction. The total surface area of this piece is only one-quarter of an inch, and the uniform coating is not more than .0002 in. in thickness—to fleets of tankers, and in variety from ship propellers to museum fossil bones.

This paper is from an address given by the author at a meeting on "New Developments in Protective Coatings for Industry," delivered in Lecture Hall of the Franklin Institute, Philadelphia, Pennsylvania.

Audubon Metalwove Belts. A 44-page catalog No. 50-57 entitled "Audubon Metalwove Belts" is now being issued by the Audubon Wire Cloth Corp., Richmond St. and Castor Ave., Philadelphia, Pa. This catalog shows numerous types of conveyor and processing belts which can be obtained in ductile metals which are resistant to various operating conditions such as high temperatures up to 2,100 degs. F., corrosion, contamination, abrasion, impact, and so on. These belts are said to have longitudinal flexibility and can successfully run over small diameter pulleys and operate on acute reverse bends.

Various weaves, meshes and wire diameters are pictured which give numerous percentages of open area for the drainage of liquids or the circulation of air, gas or steam through the belts. Likewise, various types are shown which provide the means for the safe handling of fine, coarse, heavy, granular, soft, fibrous, plastic, fragile or readily marked materials.

The catalog contains 120 photographic illustrations of various belts, four engineering diagrams showing how to design and construct the conveyors for these belts, engineering and operating hints, specifications for belts, and a questionnaire form listing the information desired by the manufacturer for making recommendations of the correct belt to solve his individual problem.

A copy of this catalog will be sent free upon request.

"Handbook of Building Maintenance." This is the title of a 60-page book which is now being issued by Flexrock Company, 23rd and Manning Sts., Philadelphia, Pennsylvania.

Innumerable shop kinks and descriptive information form a large part of the contents. The shop kinks and additional information will tremendously assist those engaged in maintenance work. A great amount of the information contained in the book deals with such subjects as the proper maintenance of roofs, floors, some construction, and information regarding cleaning.

About 200 pictures, diagrams, mechanical drawings, and art drawings assist in explaining many of the details concerning what to expect after using such materials, and what types of materials provide the best jobs under specific conditions. The book is written in a non-technical manner and has been edited by a man with more than 20 years' experience in the manufacture of maintenance materials for industrial buildings. A copy will be sent free upon request.

Mention PRODUCTS FINISHING when writing to advertisers.

The Element of *Time* In Applying PROTECTIVE COATINGS

When you use MICCROLITE or MICCRO SUPREME STOP-OFF LACQUERS in your plant, every minute of time that might be wasted in securing effective protective coatings is eliminated. No preparatory work, other than cleaning the surface to be coated, is ever required. There is no need for tape or any special treatment.

Actual application and air-drying of both materials is extremely fast. With MICCROLITE, in particular, seven coats can be applied on plating racks in one day, and the racks can be used the following morning. If the racks should become damaged while in use, it is only necessary to touch up the damaged section, the material becoming an integral part of the entire coating — the repair job being completed at once in your own plant.

If you're interested in saving time . . . in securing the most effective protective coatings (either for insulating plating racks or masking parts for hard chromium plating) . . . and in reducing your protective coating costs to a minimum, "Miccro" products will meet every requirement.

WRITE FOR COMPLETE INFORMATION.

Miccro *Supreme* **STOP-OFF LACQUERS**

AND

MICCROLITE

MICHIGAN CHROME COMPANY

6342 East Jefferson Avenue • Detroit, Michigan

THINGS YOU CAN'T GET ALONG WITHOUT

THERE are two things on every motor vehicle that contribute neither to speed nor comfort, yet they are most important accessories.

They are familiar to every driver, but neither are visible to him when driving; they have no relation to power, yet no car can operate without them; no wheel can turn safely without them; no wheel can turn safely without their being in place; the full gasoline tank would be useless without these two parts.

Yes — you guessed it! The license plates. Naturally, units so important should have the best sort of protection, for many reasons. Now that more than 70 per cent of the new cars are completely rust-proofed, every accessory should have equal protection. Owners of fine cars, who keep them in good condition, are irritated by an unsightly license plate. Identification and law enforcement are more difficult if they become dirty, rust stained and illegible.

Knowing these conditions the Michigan State Industries treat Michigan plates so that a clean, rust free condition is assured for the life of the unit. Michigan plates are Bonderized before the enamel is applied.

Michigan license plates are made in a modernly equipped plant where about 40,000 pieces are produced and finished per 8 hour day. Their Bonderizing equipment at present consists of one immersion tank of 1,280 gallons capacity taking 300 pairs per load, hung on racks and handled by a hoist on a monorail. This department also includes the necessary cleaning and rinsing tanks incident to the process.

The complete manufacturing

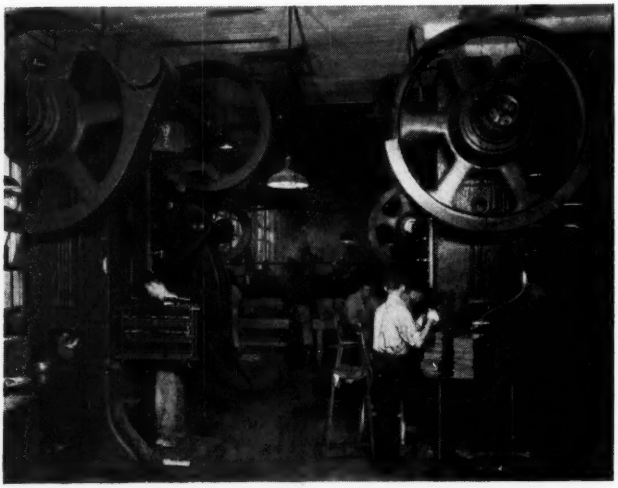


Fig. 1—Embossing license plates, with trimming in the background.

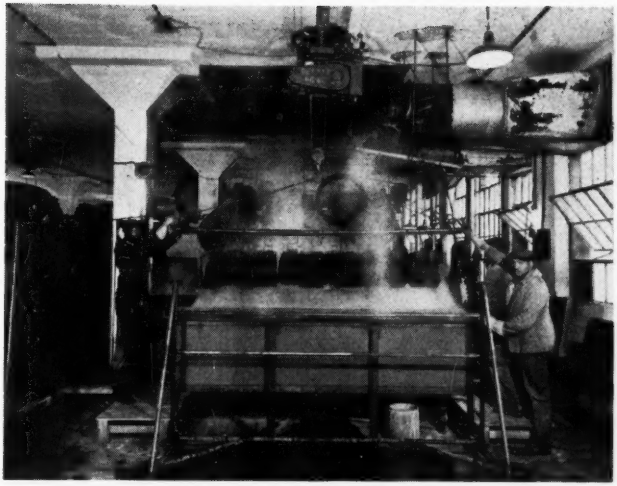


Fig. 2 — Bonderizing Michigan License Plates

routine between the hot rolled annealed, pickled in oil, continuous mill sheet, and the finished license plate, begins with shearing to size. The next steps are: embossing the numerals in pairs; trimming the corners and punching; cleaning; Bonderizing; rinsing; dip enameling; one coat of silver; dried for 30 min. at 300 degs.; roll enameling black on raised letters and figures; dried for 20 min. at 250 degs. packing and shipping to local offices all over the state, where they are ready for the millions of cars, trucks, trailers and motorcycles of Michigan automotive vehicle owners.

With modern cars finished in baked enamel, over Bonderizing, they retain their fine appearance for years longer than before scientific metal protection became common practice. The finishing methods applied to license plates that ride these better cars should keep pace, so they will not become shabby after a few months exposure to weathering and road chemicals. The Bonderized plate holds the enamel and prevents rust, even though it may be injured in traffic.

Mention PRODUCTS FINISHING when writing to advertisers.

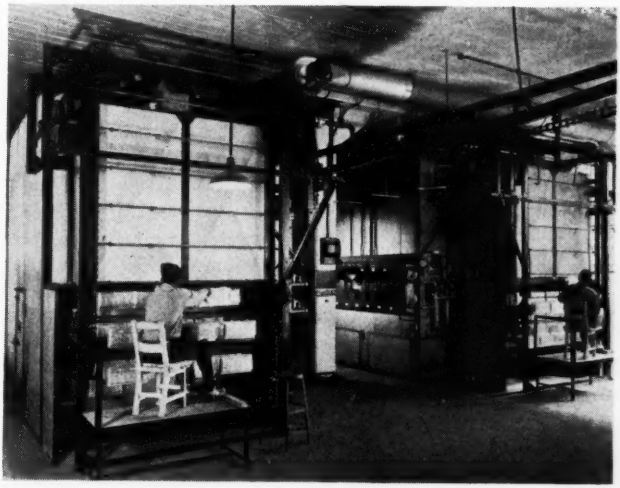


Fig. 3 — Discharge end of enameling and drying ovens

METAL COLORING THEORY AND PRACTICE—PART 4

By Joseph B. Kushner, Ch.E.
Electroplating Consultant

COPPER and alloys high in copper content offer the metal colorer considerable opportunity to display his artistry and skill. Copper readily reacts to form colored, insoluble compounds, which are a fundamental requirement of chemical metal finishing. Cuprous oxide is red, cupric oxide is black, the sulfides are black, the basic chloride, carbonate and sulphate are green. These compounds, with skillful treatment, produce through light interference and absorption a plentitude of hues and shades. To name a few of these we have: gun metal, Florentine bronze, antique copper, Flemish bronze, Tiffany green, statuary bronze, nut brown copper and Barbedienne bronze. The variety of colors that can be produced and called antique copper, for instance, make copper finishing a field day for the plater and metal colorer.

Joseph B. Kushner

Unfortunately, what is a field day to the plater is often a headache to the metal manufacturer, because the names mentioned above very often have little or no meaning from a color or treatment standpoint. They are of small help to a manufacturer who may be called upon by a customer to produce one of them on a particular metal item because invariably the customer's idea of what antique copper, let us say, should look like, is entirely different from that of the plater producing the finish.

The metal finishing industry is in definite need of color standardization today. A committee should be appointed from the leading representatives of the industry to decide on a series of finishes and the exact method for producing them, writing them up in a book of specifications. With standard solutions used under standard conditions to produce standard finishes on given metals, things would be much simpler in product finishing than they are today.

The writer envisions a time when Mr. A., a manufacturer of metal ash trays, will consult his Metal Color

Card (analogous to the Textile Colorist's Color Card in universal use in the textile industry) and tell his plating department head to give him Antique Bronze 43A on the new line of ash trays. The plater, in turn, will consult his National Metal Color Specification Book and will find on page 210 a color plate or sample of Antique Bronze 43A, with full, explicit directions for producing this finish.

Because of this standardization, a manufacturer of book-ends, Mr. B., could tell his plater that Mr. A. was making ash trays with Antique Bronze 43A finish and he wanted the book-ends to match that finish. No samples would be needed. Just a quick reference to page 210. There would be no headaches for the executive, no nervous breakdown for the harried plater matching colors haphazardly, no time and effort wasted and Mr. B.'s product looks perfectly all right alongside of Mr. A's. Of course, this is the author's personal pipe dream at present, but some day it will really be worked out.

The first copper finishes we will consider are the brown finishes.

Brown Copper Finishes

Most of the brown finishes on copper are sulfide finishes. While the color of both cuprous and cupric sulfides in mass is black, when produced in a thin film on copper, it appears dark brown. This is due to the fact that the film is so thin that it is partially transparent and some of the red copper color comes through. When the sulfide films become extremely thin, interference occurs and very often greens, purples and reds can be produced.

The equation for the reaction of copper with hydrogen sulfide is this:

$$2\,Cu + H_2S + \tfrac{1}{2}0_2 = Cu_2S + H_20$$

Oxygen and moisture must be present in order that this reaction may take place. Absolutely dry hydrogen sulfide gas will not react with copper in an atmosphere devoid of oxygen.

All the soluble sulfides are available for this reaction and sodium, potassium, calcium, barium, ammonium and antimony sulfides can be used to produce the same effect. It will be found, in general, that the polysulfides and hydrosulfides react more quickly and produce darker colors in shorter periods of time. This is one of the reasons for the addition of small quantities of these salts to ordinary sulfide baths. The polysulfides and hydrosulfides act as accelerating agents, thus speeding up the attack on the copper.

Chemical metal coloring is based on chemical reactions such as the one above. These reactions are surface reactions as well, for the most part, therefore the ultimate result obtained depends to a large extent on control of the reaction involved and the surface condition of the metal to be colored. For this reason, before proceeding to the actual formulas to be used, the following general rules should be emphasized.

1. **The work should be perfectly clean before being colored.**

Chemical coloring is produced by surface reactions. Layers of grease, smut or oxide prevent the proper reaction from taking place on these surfaces on which they are present and, as a result, non-uniform coloring is produced.

2. **Increasing the concentration of the chemical coloring compounds produces darker colors for the same time exposure.**

The reaction is driven more rapidly to the right (see equation for the reaction of copper with hydrogen sul-

fide) by increasing the amount of the reactants. This is merely a restatement of the famous chemical law of Mass Action.

3. **Increasing the temperature of the coloring solution produces darker finishes for the same time exposure.**

In general, the speed of a chemical reaction is approximately doubled by every ten degree rise in temperature.

4. **Increasing the length of exposure in the bath gives darker shades of the same color.**

In a chemical reaction, the element of time is involved. The moment a reactant (copper in this particular case) is taken out of the field of the reaction, no further action takes place.

A basic solution for producing varying shades of brown on copper consists of the following:

Potassium sulfide (liver of sulphur).....1½ oz.
Water .....1 gal.
Temperature.....150 degs. F.

After removing from the bath, brush up with a wire brush to a uniform finish. Use brush dry or wet with a relieving agent such as bicarbonate of soda or pumice, according to the effect desired.

It may be pointed out here that brushing is essential with most coloring operations. Very rarely will a metal become uniformly colored over its entire surface and it seems that brushing, somewhat similarly to paint brushing, spreads the chemical coloring evenly over the surface.

Here are some formulas for producing typical browns varying from golden yellow to almost black, which go under the names of bronzes, antique effects, oxidized, and so on.

Antimony sulfide (golden) .....½-1 oz.

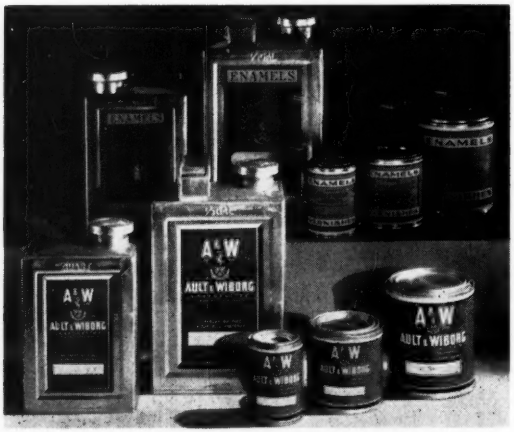
1. Caustic soda ..... 1-2 oz.
   Water .....1 gal.
   Temperature....75-160 degs. F.

Calcium sulfide.....¾ oz.

2. Ammonium hydrosulfide, ½ fluid oz.
   Temperature.....150 degs. F.

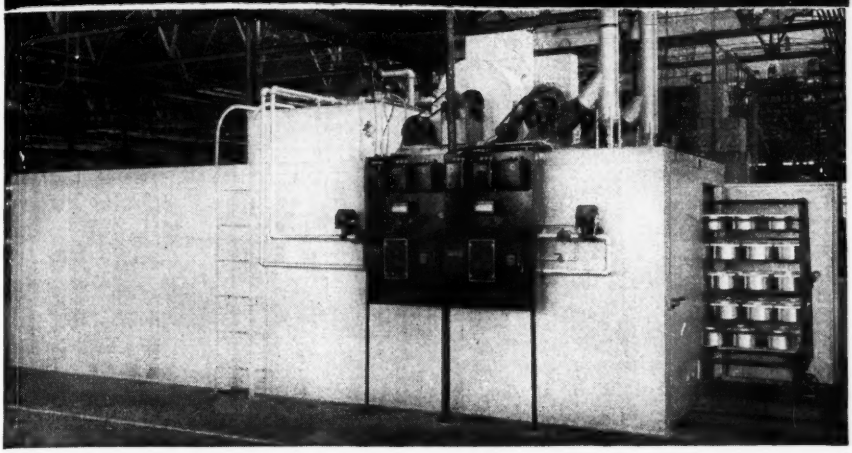
Barium sulfide.....1½ oz.

3. Ammonium polysulfide, ½ fluid oz.
   Water ..... 1 gal.
   Temperature...150-180 degs. F.



What can be achieved through proper styling is illustrated by these new can labels now being used on Ault and Wiborg products.

KIRK & BLUM INDUSTRIAL OVENS



KIRK & BLUM Industrial Ovens meet modern demands for faster production, improved finishes, lower operating costs, savings in floor space.

The installation above, designed and engineered for Victor Electric Products, Cincinnati, Ohio, consists of two Truck Type Ovens, each a separate operating unit. Ovens accommodate four trucks at one time, have full automatic control, and operate from 200 to 450 degrees. Trucks move in one end and out the other every 10 minutes.

Our Engineers have solved the drying, baking enameling problems for many leaders in a wide diversity of industries. Details of this service and valuable data on ovens and equipment mailed on request. Write today!

K & B OVENS
...are specially designed, constructed, and equipped with latest Safety Devices to insure maximum safety.

THE KIRK & BLUM MANUFACTURING. CO., 2816 Spring Grove Ave., Cincinnati, Ohio

Chicago Representative: C. P. Quion, 1661 N. Milwaukee
Pittsburgh: Bushnell Machinery Company, 311 Ross Street
Louisville: Liberty Eng. & Mfg. Co., Inc., 1450 S. 15th St.

If the colors are not dark enough, repeat dipping and brushing until the proper color is produced. The depth of the color can be also increased by momentary immersion of the treated copper in a weak solution of sulphuric acid (about 10 per cent). Another trick to try if a very dark finish is desired, is a mercury amalgamating dip before sulfiding. A weak solution of mercuric nitrate or cyanide is excellent for this purpose.

Other types of reagents may be used for producing the bronze, antique and oxidized finishes. A shade called French bronze can be obtained in the following bath:

Copper sulphate	2 oz.
Sodium hydroxide	2 oz.
Water	1 gal.
Temperature	212 degs. F.

Rinse the work well and brush with a small brass wire brush.

Odd shades of brown are produced by cathodic treatment of copper in the following bath:

Potassium bromide	2½ oz.
Sulphuric acid (conc.)	2½ oz.
Water	1 gal.
Temperature	Room
Current density	Low
Voltage	2 volts

This bath gives a grey violet brown. The addition of potassium chloride to the bath will produce peculiar greenish hues. Deposits from this type of bath are rather unstable and must be lacquered.

Solutions high in caustic soda content can very often be used to produce antique and oxidized effects on copper. An alkaline cleaner will frequently serve the purpose. The work can be immersed in a hot caustic soda solution, without current, rinsed, dried and brushed. If shade is not dark enough repeat the operations until proper color is obtained.

Green

Patina, the beautiful blue green color seen on weathered copper roofing is a natural basic sulphate or chloride of copper containing small amounts of basic copper carbonate. It cannot be reproduced exactly by any known dip method. However, there are several baths that give colors similar to it and several baths that accelerate the formation of the natural product. The U. S. Copper and Brass Association has done considerable work along these lines and information on the subject can be obtained directly from them. One method the writer knows of that is quite successful in simulating patina is the following:

Muriatic acid	1 qt.
Basic copper acetate	3 lbs.
Copper carbonate	1 lb.
Powdered arsenic	½ lb.
Ammonium chloride	3 lbs.
Water	1 gal.

Apply this paste with a brush and permit the work to dry for two to three days. Repeat the process until the right shade is obtained. The patina layer is strongly adherent.

Another shade of green is produced by treating copper in a solution made up as follows:

Copper nitrate	2 oz.
Ammonia	3 fluid oz.
Ammonium chloride	4 oz.
Sodium acetate	4 oz.
Water	1 gal.

Use hot. Dip work and permit the solution to dry on it. If the green is not deep enough, repeat the dipping operation on the dried work.

Blues and Blacks

A gun metal blue can be obtained on copper by use of the following solution:

Antimony chloride.....1 oz.
Ammonium polysulfide, 1 fluid oz.
Sodium cyanide .....2 oz.
Water .....1 gal.

Use the solution hot. Dip until desired shade is obtained. Relieve with a wet scratch brush. Current can be used with this bath to give the blue color more rapidly. The work is made cathode. Steel anodes are used. The recommended voltage is 3-6 volts.

A deep black color can be obtained on copper with the solution given here:

Sodium hydroxide .....1½ oz.
Potassium persulphate .. ½ oz.
Water .....1 gal.

Use at boiling point.

Hold work in the solution for about five minutes, then rinse, dry, and rub.

Solutions of arsenic compounds can be used for blackening copper. The writer has found the following formula effective:

Arsenic trioxide ..... 3 oz.
Ferrous sulphate ..... 2 oz.
Muriatic acid.....10 oz. (fluid)
Water ..... 1 gal.

Use this solution at 180 degs. F. or use at room temperature with current making the work cathodic at a voltage of about 6 volts with iron anodes.

A blue color can be obtained with the well-known lead-hypo color wash solution. A typical composition is:

Lead acetate ..... 3 oz.
Sodium thiosulfate (hypo), 6 oz.
Water ..... 1 gal.

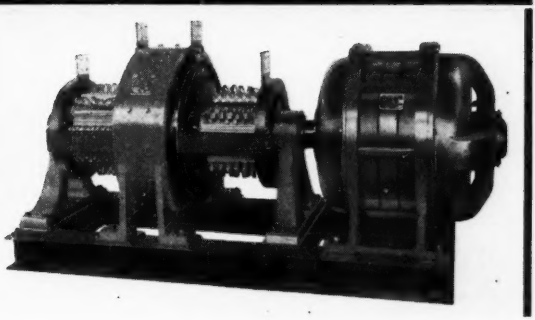
Use this solution boiling hot.

Blacks can also be produced by treating copper in one of the previously mentioned sulphide baths used hot and concentrated. Momentary

FOR HIGH QUALITY PLATING

COLUMBIA

LOW VOLTAGE GENERATORS



Columbia Generators and Motor Generator Sets are built to meet the exacting needs encountered in electro-plating and cleaning work. Sizes range from ½ to 250 KW, 100 to 40,000 amperes, 6 to 60 volts. Bulletin 700 tells the story behind their dependable performance. May we send you a copy?

COLUMBIA ELECTRIC MFG. CO., 4528 Hamilton Ave., Cleveland, Ohio

AIRWAY *Ventilated* BUFFS

To the Executive.

To the Purchasing Agent.

To the Polishing Room Superintendent.

Gentlemen:

It may be you don't even know what we are talking about because you have never used AIRWAY VENTILATED BUFFS, but that's no excuse. If you buy AIRWAY VENTILATED BUFFS then you will know what we are talking about when we say we will save you 50% on your cotton buff wheel costs.

JACKSON BUFF CORPORATION

L. W. MacFarland

President.

JACKSON BUFF

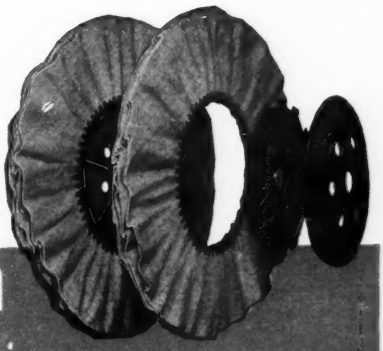
21-03 41st AVENUE

AIRWAY *Ventilated* BUFFS

We claim 50c on the dollar saving. We don't care whether it is $1,000.00 or $10,000.00. You can't with safety challenge that statement. We can with safety make it.

Warning Notice

Jackson Buff Corporation of Long Island City, New York, has rights to U. S. Patents Nos. Re 19,894 and 2,140,208 which have broad claims covering an air-cooled buff having means for the admission of air through the sides of the buff. Owner intends to protect all rights and stop infringement.



CORPORATION

LONG ISLAND CITY, N.Y.

cathodic treatment of a sulphided specimen in an alkaline bath will produce an intense black smut which is easily relieved by hand wiping.

Red

The most beautiful red finish obtainable with copper is the famous "Royal Red" or "King's Red" as it is sometimes called. This color can be produced by a heat treatment or by a dip in molten sodium nitrate. For production work, the nitrate bath is definitely superior. Sodium or potassium nitrate is placed in an iron kettle and heated until it melts (approximately 1,000 degs. F. or so). Immerse the work in the molten salt, hold there for about 5 minutes or so, then remove and dip into paraffin oil to prevent staining, dry, and buff on a soft red rouge wheel. The worker who uses this process should, by all means, wear an asbestos apron and gloves and a pair of strong goggles, as there is a tendency for the nitrate to spit out from the pot, particularly if colder objects are immersed in it.

To produce the famed red color by heat alone, the following must be done: 1. Plate work with a coat of lead.* After work is lead coated, heat it uniformly with a blow torch until a medium red. The work on cooling will appear a dense black due to the lead coating, but underneath the copper will be red. Buff off lead with a rouge wheel.

Heat Treatment Colors

The application of heat to copper promotes its direct oxidation in air. Varying thicknesses of the oxide film are formed at varying temperatures and the films are generally so thin that the colors produced are almost entirely due to light wave interference. The production of colors with the blow torch is an art not to be attempted by the beginner. Beautiful effects can only be achieved by the experienced and skilled craftsman.

Other Interference Colors

Solutions of copper lactate give rise to a series of beautiful interference colors. The work is made cathodic in the lactate solution, and depending on the conditions of operation, a series of hues are obtained which range from golden yellow to deep purple. The process is patented.*

The cuprous alloy coloring processes will be discussed in the following installment of this series.

** See "A Resume of Lead Plating," J. B. Kushner, Metal Ind. June, 1939, p. 231.*

** Controlled by United Chromium Inc.*

NOTE: During the course of this series the writer will be pleased to answer questions on metal coloring. Address queries to the author in care of PRODUCTS FINISHING.

Alvey-Ferguson Conveying Machinery. A completely illustrated catalog presenting facts on belt, live roller, apron, and vertical conveyors is now being issued by The Alvey-Ferguson Co., 210 Disney St., Cincinnati, Ohio. Wherever packages, cartons, cases, parcels, boxes, and bulk materials must be transported, Alvey-Ferguson standard and specially designed belt conveyors are said to provide economical and efficient transportation.

Level, inclined, and declined belt conveyors, or combinations of these features, are designed with either the roller bed or slider bed construction according to the material being handled. Standard designs for a wide range of applications are described.

A copy of this catalog will be sent free upon request.

Mention PRODUCTS FINISHING when writing to advertisers. Your cooperation will be appreciated both by the advertiser and this magazine.

UDYLITE BALL ANODES *for* COPPER, CADMIUM, ZINC, BRASS AND TIN PLATING

Because they offer an unusual combination of advantages, Udylite ball anodes are used in hundreds of plating plants, where they have materially contributed to the efficient, economical operation of alkaline plating baths.

Constant anode area is maintained with ball anodes. The metallic content of the bath is kept constant thus assuring maximum plating efficiency at all times.

Scrap losses are eliminated. Full value is received from every particle of metal used. Ball anodes corrode evenly as they descend in the container.

Ball anodes are convenient to use. Even in large installations it takes but a few minutes of one man's time to place balls in the containers as the anodes corrode and leave space for them.

Try Udylite ball anodes by using them in one of your tanks. The Udylite office nearest you will be glad to provide full details.

THE UDYLITE CORPORATION

1651 E. Grand Blvd., Detroit, Michigan

New York, 30 E. 42nd St. | Chicago, 1943 Walnut St. | Cleveland, 3756 Carnegie Ave.

In addition to ball anodes, Udylite furnishes ALL types of anodes—all metals—all shapes.

ARCHITECTURAL PORCELAIN ENAMEL FOR INTERIORS

IN the past few years, vast strides have been made in the improvement of architectural porcelain enamel for building purposes. Although the use of porcelain enamel in architecture was actively introduced about ten years ago, the many possibilities of this unusual material have only recently begun to be thoroughly appreciated. From its early use as a metal roofing tile and other building applications, porcelain enamel has been developed to a point where literally tens of thousands of stores, service stations, and other types of buildings have been successfully and attractively finished in this durable, colorful material.

Another recent development of the use of porcelain enamel as a building material is its application for interior finishing. The Chicago Vitreous Enamel Product Company of Cicero, Ill., has been one of the leading exponents of porcelain enamel as a building material. The first conclusive proof of the efficiency of this material is the installation of approximately 13,000 square feet of porcelain enamel in their extensive research and testing laboratories, which were erected during 1936. At that

Fig. 1—A view looking through the entrance into the reception room where a liberal use of architectural porcelain enamel in combination with other materials has created an extremely pleasing effect. The receptionist compartment is finished with shining black porcelain enamel topped with clear glass panels set in bronze. The back wall of this compartment is finished in calf skin brown which blends well with the ivory porcelain enameled pattern on either side.

Fig. 2—A view showing an interesting wall mural which was fired into the architectural porcelain enamel wall panels. This application is typical of the numerous careful manufacturing operations required in the production of quality porcelain enamel.

●

time porcelain enamel was used for walls, ceilings, doors, and many other applications.

Now this company, in completing extensive alterations to their executive and general offices, have made further and even more elaborate use of architectural porcelain enamel. In contrast, however, to the type of construction employed in the laboratories, the latest method of handling provides a clean, unbroken surface of porcelain enamel without the use of attachment strips or other earlier methods of fastening panels to walls and ceilings. Formerly, the porcelain enameled wall panels were made of comparatively light gauge metal without flanges on the edges which were covered by attachment strips. These panels were backed up with insulation board, a process adopted to insure an insulated, flat unit. Now the panels employ no attachment strips, the flanges of the panels are slotted and hung to furring strips by means of concealed hooks. The panels are fabricated from 18 gauge metal to which an insulation board is veneered under high pressure backed up with a sheet of light gauge galvanized metal, thus making a flat, rigid building unit.

In keeping with the use of the latest type of architectural porcelain enamel, the offices have the advantage of modern indirect lighting, sound insulation and complete air conditioning.

The new reception room is an excellent example of how the liberal use of architectural porcelain, used in combination with other materials, can create an extremely pleasing effect. The receptionist's compartment has a waist-high base finished with shining black porcelain enamel, and is topped with clear glass panels set in bronze. The compartment sets against a back wall of calfskin brown porcelain enamel which blends well with the ivory porcelain enameled panels on either side. On the same elevation, entry doors and windows of bronze fitted with moulded glass pro-

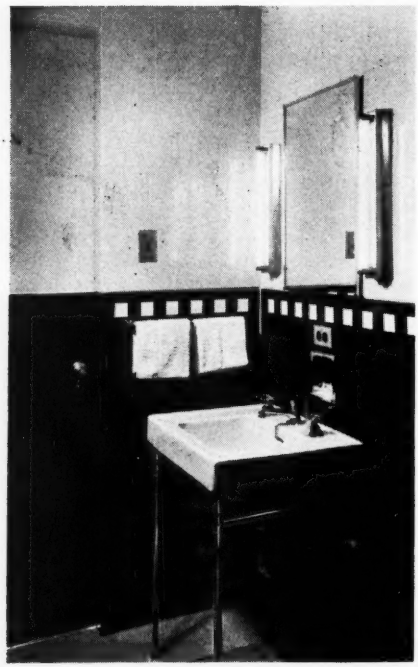


Fig. 3—A view of the executive office washroom of the modernized office. Architectural porcelain enamel panels for walls and ceiling are in Prussian tan and black.

vide adequate lighting for a corridor behind, but the moulded glass prevents clear vision, thus insuring privacy.

The floor of the reception room is terrazzo with bronze detail insets, and the color is in harmony with the other colors of the room. Several ceiling-high mirrors, divided by porcelain enameled pilasters, create an impression of additional spaciousness. The balance of the wall area is finished in clean maple green porcelain enamel. Incorporated on each wall is a mural permanently fired into the porcelain enamel finish. One of the murals carries out the research motif, the other typifies the numerous manufacturing operations involved in the production of porcelain enamel. Each wall section has panels fabricated to form a compound curve and furniture has been fitted to this contour. The seats are leather covered and are trimmed in bronze. General lighting is provided by fluorescent tubing receded in ceiling coves. Doors and venetian blinds are of bronze.

The men's room, as shown in Fig. 3 in these modern offices, is unusual in that all the main walls are constructed of 10-in. convex architectural porcelain enameled wall panels

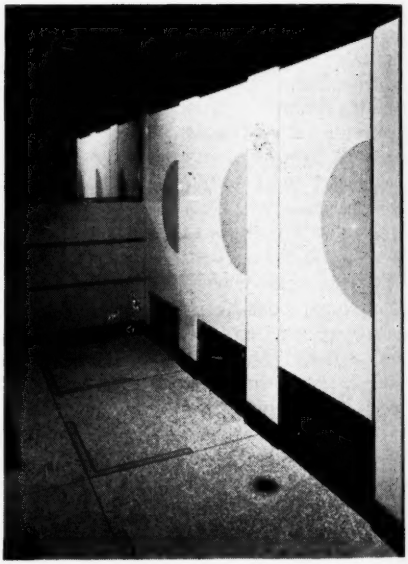


Fig. 4—The enclosures in the women's washroom are of double face porcelain enamel, have a black base and grey "push" areas on a field of peach. All units of the enclosure are veneered under extremely high pressure to a combination core of plywood and insulating board.

of satin-matt ivory, with a similar finish on the blue base course of flat panels. The ceiling is finished in glossy, mulberry-red porcelain enamel, which matches the dotted decorative treatment at the top of each wall panel. The skylight is circular and is recessed.

Flush type enclosures, completely porcelain enameled, have a field of ivory which matches the lavatories and wall panels. For contrast, "push" areas on the enclosure doors are in mulberry-red with blue bands running horizontally. Hand driers are cast iron porcelain enameled in blue to match the blue wall panels.

In the ladies' washroom the predominating color is grey. In the area beneath the large mirrors, and behind the lavatories, is a delicate peach tone —all in porcelain enamel. Horizontal burgundy stripes and burgundy lavatories provide a pleasing contrast for this peach background. The flush type enclosures of double face porcelain enamel have a black base and grey "push" areas on a field of peach. All units of the enclosure are veneered under extremely high pressure to a combination core of plywood and insulating board, thus making the material as solid, substantial and rugged as a slab of marble or granite. Hand driers are cast iron porcelain enameled in a matching grey.

All the rooms described, by virtue of their easy-to-clean surfaces, have reduced maintenance to the minimum. While the designs of the various rooms are somewhat more elaborate than might be installed in the average manufacturing plant or business building, Roy Blass of Chicago, the architect, purposely made them so in order to demonstrate the feasi-

Pre-tested SUNOCO SPIRITS "REDUCED OPERATING COSTS" ...reports Large Manufacturer!

SUNOCO Spirits is saving this manufacturer dollars and cents as a paint reducer for metal finishing . . . thanks to its high solvency and good wetting out properties. And in *metal cleaning* SUNOCO Spirits gives economy . . . speed . . . and efficiency, because it cuts costs . . . cuts time . . . and cuts grease.
Write for free folder "Cleaning Up" . . . gives facts you should know about SUNOCO Spirits.

SUN OIL COMPANY, Philadelphia

SUN OILS

PETROLEUM PRODUCTS FOR ALL INDUSTRIES

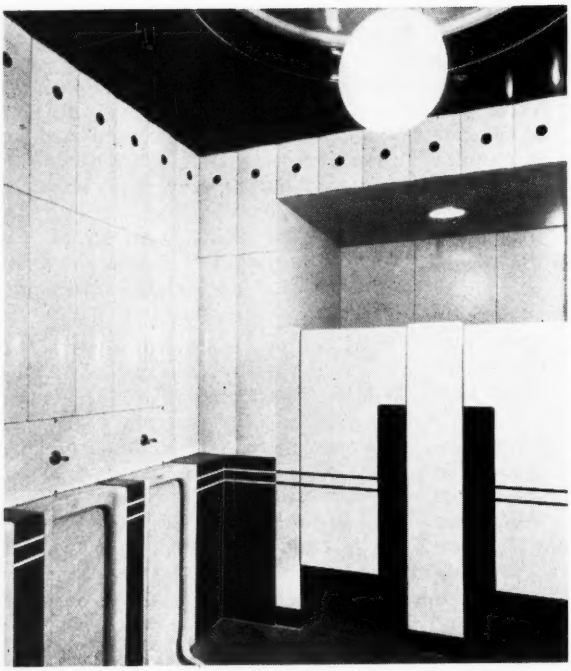


Fig. 5 — All main walls of this men's washroom are constructed of 10-in. convex architectural porcelain enamel wall panels of satin-matt ivory with satin-matt blue base course in flat panels. The ceiling is finished in glossy mulberry red porcelain enamel which matches the circular decorative treatment at the top of each wall unit.

●

bility of use and a few of the many possibilities which can be worked out through the use of architectural porcelain enamel. If these somewhat theatrical effects can be proved practical, then certainly the more conservative colors and designs automatically become an assured success. In the short span of four years (since Chicago Vitreous erected their elaborate laboratories) the remarkable improvements made to this building material gives cause to the belief that there is an encouraging future for porcelain enamel in the architectural field.

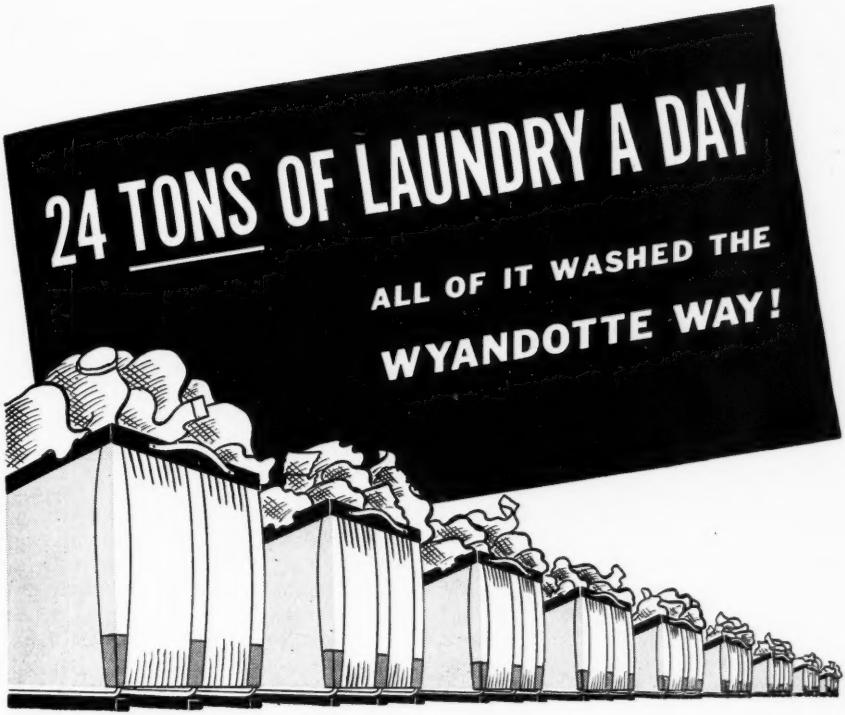
"Sulphated Oils and Allied Products" is the title of a book written by Donald Burton and George F. Robertshaw which is now being published by Chemical Publishing Co., Inc., 148 Lafayette St., New York, N. Y. This book is said to be complete with references, and the analytical procedures are very definite, leading to standardization of method, and the chemistry of sulphation is up-to-the-minute.

Sulphated, or sulphonated oils as they are usually called, are remarkable not only for the variety of materials which may be sulphated but also for the variety of products which may be obtained from one material. The sulphate oils have become increasingly important as wetting and emulsifying agents.

This book is timely on the chemistry, literature, and analysis of the sulphated oils and allied products. The compounds produced by the interaction of sulphuric acid and the unsaturated components of a fatty oil are not only complex in themselves but are liable to be altered according to the washing or neutralizing procedure. The authors of this work are prominent in work clarifying the methods of analysis and their decision to review the analytical chemistry of these products at the present time is appropriate and welcome.

Copies of this book are available at $5.00 each and may be obtained by writing to the Chemical Publishing Co., Inc., 148 Lafayette St., New York, N. Y.

Mention PRODUCTS FINISHING when writing to advertisers.



WYANDOTTE likes big jobs! Whether it's a job of laundry production or a job of metal cleaning production, we're equipped to deliver results and keep the cleaning line *moving*.

Here's an example: A big laundry uses Wyandotte to wash *96 thousand pieces a day!* That's 24 *tons* of work a day, *13 million pounds a year!* A man-sized job, done by Wyandotte at minimum cost!

Just as the Wyandotte Laundry Service Representative solved this laundry's problem with a Wyandotte product, *your* local Wyandotte Industrial Representative can help you to determine which of the many Wyandotte metal cleaners will do your job best. Simply write to The J. B. Ford Sales Co., Wyandotte, Michigan.

Wyandotte

SERVICE REPRESENTATIVES IN 88 CITIES

THE J·B·FORD SALES CO· WYANDOTTE MICH·

BARREL FINISHING OF METAL PRODUCTS

Continuing Factors in the Barrel Finishing of Plastics.

By H. Leroy Beaver

WHILE barrel finishing research, strictly speaking, should be confined to those operations wherein the barrels themselves are used, we must also note that not only on metals but on plastics as well, certain operations are necessary prior to actual barreling operations.

In the various forms of plastic parts, all of the various barreling operations can be materially aided by a far more than mere casual attention to the dies in which the parts are formed. It is a generally understood rule that the finer and higher degree of polish placed on the die mold surfaces themselves, the finer will be the degree of finish of the castings. It is in this phase that the die sinker, the electroplater and the plastics molder can very closely cooperate in order to produce the most efficient molds for forming the multitude of plastic products now becoming so widely distributed.

Where only a few parts are required, many plastics manufacturers have thought it to be more economical to work on parts from an average mold rather than add the expense of fine polishing and chromium plating, even though longer cycles of time in the various barreling operations are required. In the production of molds for large quantity production, however, there can be no question but that molds very carefully made, polished and then finally hard chromium plated and with a very high and bright lustre finish will more than repay the additional first cost. Finely finished molds will be found to be far more resistant to wear, and the surface finish of parts produced from such molds are more susceptible to barrel finish operations.

While the mold itself and the degree of fineness of its surface finish are important as bearing on subsequent barreling operations, no mold can compensate for careless molding practice. In injection molding, for example, if insufficient heat or too short a molding cycle has been used, such articles will tend to have poor strength with the added possibility of scaly surface, sink marks and poor welds. In addition, the clearness of

what should otherwise be transparent colors may and probably would be seriously affected. On the other hand, if excessive heat is used or the molding cycle is too prolonged, the result may and probably would be overflow, discoloration and perhaps actual charring of the plastic material in the heating cylinder. In some cases, the lack of air vents in a mold, where required, will result in the trapping of heated air which will cause burn marks on the plastic parts. All defects of this character are accentuated by barreling processes as the parts are worked toward the final finish.

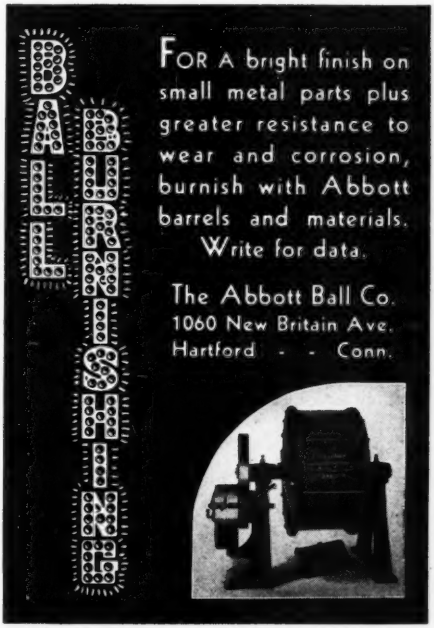
While not so important on plastics parts that are designed for hand finishing, the mold contours for plastics to be barrel finished are worthy of some comment. Just as in the blanking and forming of metal stampings preparatory to barrel finishing operations, in plastics, sharp edges, corners and angles should, as far as possible, be avoided. If corners are rounded in the molds, the danger of chipping and nicking of sharp edges is largely avoided, thus effecting the saving of many parts that otherwise would be rejected.

The removal of parting fins, at least by some operators, is rather regarded as only a very casual, short and simple operation. This may be true of parts coming from new dies where fins are extremely light in structure, but it must be remembered that the plastic materials themselves, irrespective of the manner in which they are molded, are abrasive in character. As the mold continues in use and becomes worn, the size and thickness of the parting fins will increase in due proportion.

Light fins can be easily removed by the use of screened panels inserted in a barrel. A portion of the fin will be removed up to the point where the fin is heaviest due to excessive die wear. Barrel methods for their removal rapidly becomes increasingly non-effective and in such cases the fins must be carefully ground off either on a sand belt or set-up wheel before a barreling operation is attempted. In any operation preliminary to barreling processes, the use of a comparatively fine grain abrasive (220-320) is suggested because deep scratches from coarse grit or grain abrasive material will require longer operating cycles in the barreling operations.

On plastic parts that have been turned from rod material, the selection of proper tools and the closest care used in their operation will always be repaid by a substantial gain in the barrel finishing time required.

Fine, even surfaces in molds, small gates, fine parting fins and care in


FOR A bright finish on small metal parts plus greater resistance to wear and corrosion, burnish with Abbott barrels and materials. Write for data.
The Abbott Ball Co.
1060 New Britain Ave.
Hartford - - Conn.

tool forming all add to the ease of the final barrel finishing operations. Phenolic Resins and Urea plastics when molded and also when barrel finished generate heat in the process and have a tendency to sweat a very fine film of almost pure clear resin to the surface. This may largely assist in masking mold marks, abrasive scratches and tool marks. On the sweated layer or clear resin, there seems to be a difference of opinion among plastic finishers that would be somewhat comparable to that of platers where some insist that a slightly roughened surface provides a better bond for the plate and others just the opposite. In the same manner, one plastics operator will contend that he cannot obtain a satisfactory final finish on the clear resin layer and that it must be barrel finished off, while others claim just the opposite to be the case.

It is desirable, of course, whenever possible, to cast holes in plastic parts by means of insert pins in the molds, but this is not always possible. Most any kind of drill cannot be used to drill plastics. Generally, the flutings of the plastics drill are wider and the set of the drill somewhat variable to that used on metals. When drilled holes are to be threaded or tapped, we have always found it safe practice, and indeed almost essential, to slightly countersink such holes to prevent chipping out of the edges for the reason that the edges of chipped holes cannot be smoothed over or corrected by any subsequent barrel finishing procedure. The precautions that must be observed in order to avoid chipping during tapping operations are also pertinent to mention in connection with the barreling operations for some of the synthetic resins which are more brittle than others, and where barrel finishing by the action of impingement, previously commented upon must be avoided. Of course, impingement can be avoided by maintaining the parts within the burnishing mass and with comparatively slow barrel speed.

The process of "ashing" which we have also previously mentioned as an historical practice, in reality originally referred to a process of using a wheel built to the required thickness from layers of muslin to which was applied a thin paste composed of either F, FF, or FFF pumice and water. Later, barreling operations also embraced the use of pumice and water to reduce surfaces and especially on celluloids, but the term "ashing" still applied (in the manufacture of silverware and especially flatware, such as knives, forks and spoons, a similar operation performed with a walrus hide wheel and pumice, used wet, is termed "bobbing"). However, "ashing," when used in connection with the barrel finishing of plastics refers only to an operation wherein sawdust or some other material treated with a suitable binder medium and the desired grit or grain of abrasive, is used dry.

While ashing by wet wheel process unless performed by a skilled operator had a tendency to the production of uneven or wavy surfaces, a dry ashing process will provide uniform removal over the entire surface area. Theoretically, in a barrel ashing process, equal removal from every part is suggested and actually believed by some, but as a matter of fact, this is not true, because the amount of material removed from angles will be considerably more than that removed from perfectly flat areas. When working to close tolerances, care must be exercised in any abrasive barreling process lest too much material be removed from such edges.

When the preceding precautions have been noted and observed and their importance understood, we may proceed to the actual barreling operations.

In the first operation that has for its primary purpose the removal of the surface scratches developed in removal of fins and gates and tool marks, as previously mentioned, the barrels are generally either single, double or triple pocket type, the pockets averaging about 24 x 24 in. in size. The pockets are generally loaded to one-half or slightly over one-half full of parts and abrasive sawdust. One mixture that is frequently used is a combination of rather coarse maple sawdust treated with Turkish Red Oil (Stearic Acid) and then dusted with twice ground tripoli, the oil being used as a binder to hold the abrasive in suspension. Wood pegs of appropriate size are then added to act both as separators and as weight carrying mediums. The fact that the first operation requires operating cycles of from 10 to 16 hours continuously suggests that some far more appropriate material than sawdust and wood pegs are required.

After the first operation, the parts will have a matte finish but not sufficiently fine to permit a final polishing operation, and so a secondary operation is carried through in another barrel where the same procedure is followed as in the primary operation with the exception that the abrasive material is a finer, softer, and slower cutting material such as precipitated chalk or Spanish Whiting. While suggested time of operation is often given, it means little because in either operation the bar-

CLINCO

CLEAR METAL LACQUERS

Especially formulated for use on cadmium silver and zinc plated articles.

Clinco clear metal lacquers will correct any difficulty which you may have with adhesion, corrosion or tarnishing on the above surfaces.

We would appreciate an opportunity to submit a material that will solve your problems.

We also manufacture a complete line of pigmented lacquers, primers and air dry or bake synthetic enamels for use on metal.

THE CLINTON COMPANY

1210-30 ELSTON AVE. • CHICAGO, ILL.

reling must be continued until the desired and necessarily fine smooth matte is obtained.

Following the secondary operation, the parts must be cleaned. The cleaning operation requires a brief barreling with an oil-treated sawdust but no abrasive, the purpose being to remove as much of the abrasive from the parts as possible.

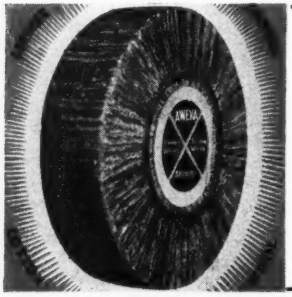
Having been thus cleaned of abrasive material, the parts are now considered to be ready for the final polishing process which is generally accomplished with the aid of a combination of dissolved waxes principally bees wax and carnauba wax. By way of explanation, bees wax is, of course, well known as a staple product of many uses, and may be had in natural color or bleached. Carnauba wax, however, is not so well known, but is a wax derived from the Carnauba Palm tree. Both waxes are regular constituents of shoe polishes and both are readily soluble in pure gum spirits of turpentine. There are many combinations of wax finishes, more of which will be described in a later paper covering materials.

As between a plastic part polished with regular compositions and polishing wheels and the same parts polished by a coating of dissolved waxes there is, of course, a very great difference in the degree of permanence of the polished surface finish. Plastics are not soluble in turpentine and a wax polished part may be detected by immersion in turpentine which will very quickly dissolve the wax on the surface. From this we may safely conclude that a wax polish on a plastic part is just about comparable to a wax polish on a pair of shoes, because the constituents of a wax polish for plastics and a wax polish for shoes are practically the same.

To the drawback with respect to the long operating time cycles required in barreling operations due to the inadequacy of the weight adding materials as at present used, we must add the further inadequacy of a not too stable final finish.

While the operation known as waxing polish as briefly described is supposed to constitute the equivalent of the operations known as cutting and coloring as carried out with buff wheels and compositions, they are far removed in final result.

Current research requirements unmistakably point in the direction of efforts toward finding more suitable weight adding materials and more effective mediums for both abrasive and polishing operations, so that barrel finishing of plastics may be truly said to be both mechanically possible as well as commercially practicable, a point in which there is now a very considerable difference of opinion.



GRINDING & BUFFING WHEELS

HIGH Grade
LOW Price
LONG Life

MANUFACTURERS OF AWEKA SPECIALTIES

• *ESTIMATES CHEERFULLY FURNISHED* •

ATLANTIC WEKA CORP.

35 WOOSTER ST. NEW YORK, N. Y.

Oakite Certified Cleaning. Eighteen successful maintenance methods where Oakite materials are said to save money, time, step up efficiency, and avoid occupational and fire hazards are described in a folder which is now being issued by Oakite Products, Inc., 20 Thames St., New York, N. Y.

A copy of this folder will be sent free upon request.

"The Testing of Porcelain Enameling Furnaces." This is the title of a report of an investigation conducted by the research and analytical laboratories under the direction of M. J. Bozsin of the Ferro Enamel Corp., 4150 E. 56th St., Cleveland, Ohio. The technical staff of the Ferro Enamel Corp. is now publishing this report and will send copy to those interested, free upon request.

The report has been designated as technical bulletin No. 4 and summarizes the technique of testing enamel furnaces developed over a period of six years by the research and analytical staff of the Ferro Enamel Corp. The data presented is of particular interest and importance because of the large number of furnaces and operating conditions represented.

Bristol Air-Operated Free-Vane Controllers. Air controlled instruments and their applications are completely described in this catalog which is now being issued by The Bristol Company, Waterbury, Connecticut.

Special attention is given to Bristol's free-vane principle of operation in air control.

The flexibility of operation and the simple hand-adjustable features are also explained. The various models for the control of temperature, pressure, liquid level, and pH value are illustrated and fully described. The models are accompanied by isometric drawings explaining the three basic types of control available. Bristol's system of pneumatic and electric remote control is also explained.

A copy of this catalog will be sent free upon request.

Mention PRODUCTS FINISHING when writing to advertisers.

THE LOW TEMPERATURE BLACK BATH

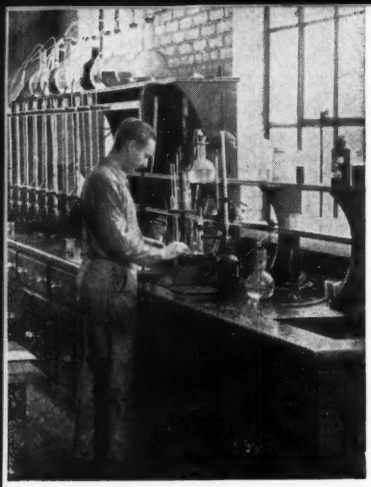
DU-LITE DU-LITE

STEEL COLORING PROCESS

A non-technical, fool proof process producing a deep black wear and rust resisting finish. Only one bath required for most work. Write for details. Send us samples for processing.

DU-LITE CHEMICAL CORPORATION

MIDDLETOWN, CONN.



THE Finishing FORUM

Removing Water From Compressed Air Lines

By JOHN E. HYLER

THOSE who manage manufacturing and finishing plants where compressed air is used are sometimes mystified by the amount of water that collects in the compressed air line. Moisture in the air line can cause trouble, especially when the air is used for cleaning purposes and removing dust from workpieces prior to finishing.

Perhaps the greatest evil attendant upon the use of moisture-laden air is in the application of finishing materials by means of spray guns. In this case, the tiny droplets of moisture intermingle with the finely-divided finishing materials being applied, and thus cause trouble with the finish obtained.

Investigation shows that air always has a certain vapor content, and when air is compressed, heat is induced. The more the air is heated, the greater is its affinity for moisture. When the air is suddenly expanded, there is an instant cooling effect which has a tendency to condense the moisture out of the moisture-laden air. When air issues from a nozzle under pressure there is a sudden expansion and the moisture is carried along in the expanding air stream in the form of vapor.

(*Continued on page 59*)

Do you have a metal finishing problem?

Through the cooperation of outstanding authorities in the fields of metal cleaning, plating, burnishing, lacquering, and so on, PRODUCTS FINISHING is prepared to aid you in the solution of your finishing problem. There is no charge for this service.

Also . . .

If there is a "kink" or short cut in use in your shop, send in a description of it. Each one published will be paid for.

No. 9 Alcohol Test

Determination of the resistance of an organic finish to alcohol.

APPARATUS: Denatured alcohol, grain alcohol, containers, thermometer.

PROCEDURE: Completely finish two panels so that no bare metal is exposed. After aging the panels twenty-four hours, immerse one in the denatured alcohol and one in the grain alcohol to a depth of two inches. Maintain the alcohols at seventy degrees Fahrenheit. Allow the panels to remain immersed until breakdown occurs, making daily inspections by withdrawing the panels and wiping the finish with a clean cloth. The test period, aging period and temperature may be varied to suit particular requirements.

CONCLUSIONS: The time for the softening of the film, bubbling and change in color and gloss is indicative of the resistance of the finish to alcohols.

No. 10 Alkali Test

Determination of the resistance of an organic finish to alkaline solutions.

APPARATUS: Five per cent solutions (by weight) of soda ash and caustic soda, containers, thermometer.

PROCEDURE: Completely finish two panels so that no bare metal is exposed. After aging the panels twenty-four hours, immerse one in the soda ash solution and one in the caustic soda solution to a depth of two inches. Maintain the solutions at seventy degrees Fahrenheit. Allow the panels to remain immersed for one week, making daily inspections. The alkali concentrations, test period, aging period and temperature may be varied to suit particular requirements.

CONCLUSIONS: The time for softening of the film, bubbling and the change in color and gloss is indicative of the resistance of the finish to alkaline solutions.

No. 11 Inorganic Acids Test

Determination of the resistance of an organic finish to inorganic acids.

APPARATUS: Ten per cent solutions (by weight) of hydrochloric acid, nitric acid and sulphuric acid, acid-proof containers, thermometer.

PROCEDURE: Completely finish three panels so that no bare metal is exposed. After aging the panels for twenty-four hours, immerse one in the hydrochloric acid, one in the nitric acid and one in the sulphuric acid to a depth of two inches. Maintain the solutions at seventy degrees Fahrenheit. Allow the panels to remain immersed for one week, making daily inspections. The acid concentrations, test period, aging period and temperature may be varied to suit particular requirements.

CONCLUSIONS: The time for softening of the film, bubbling and corrosion of the base metal and the change in color and gloss is indicative of the resistance of the finish to inorganic acids.

Determination of the resistance of an organic finish to organic acids (fruit juices).

No. 12 Organic Acids (Fruit Juice) Test

APPARATUS: Five per cent solutions (by weight) of acetic acid and citric acid, acid-proof containers, thermometer.

PROCEDURE: Completely finish two panels so that no bare metal is exposed. After aging the panels twenty-four hours, immerse one in the acetic acid and one in the citric acid to a depth of two inches. Maintain the solutions at seventy degrees Fahrenheit. Allow the panels to remain immersed for one week, making daily inspections. The acid concentrations, test period, aging period and temperature may be varied to suit particular requirements.

CONCLUSIONS: The time for softening of the film, bubbling and corrosion of the base metal and the change in color and gloss is indicative of the resistance of the finish to organic acids (fruit juices).

THE FINISHING FORUM

(Continued from page 56)

It is possible to avoid the trouble caused by moisture in the air lines by removing the entrained moisture from the compressed air lines by means of mechanical devices. A moisture separator can, in most cases, remove the moisture satisfactorily from the compressed air. The mechanical moisture separator operates on the principle of permitting the air to expand at one point in the line, and also to force it to take a sharp downward and upward turn at that point. The purpose of the turn is to obtain centrifugal force. The tiny drops of moisture which form at the turning point in the line are thrown from the air stream down to the bottom of the separating device, from which point the moisture can be periodically drained.

In order to obtain the greatest possible efficiency, the separator should be located at a point in the compressed air line where the atmosphere is relatively cool. A cool temperature will assist in the precipitation of the moisture. Some separators are equipped with water cooled jackets in order to increase their efficiency.

A supplementary method of removing moisture from compressed air lines consists of heating the air just prior to the point of issuance. Occasionally, a tiny droplet of moisture will escape through the moisture separator, thus the heating of the air assures complete removal of such escaped moisture. Heating the air prior to issuance is only recommended, however, where the finest of finishes are being applied. Heating the compressed air pipe may be obtained by electrical strip heaters of the type designed for pipe heating.

Make plans now to attend the . . .

1940 CONVENTION
AMERICAN ELECTROPLATERS' SOCIETY
June 10-11-12-13

THE DAYTON BILTMORE HOTEL
DAYTON, OHIO

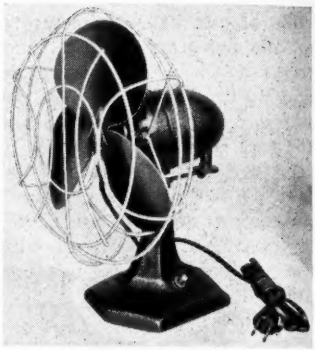
GENERAL CHAIRMAN—Chas. C. Conley, 2505 Catalpa Drive, Dayton, Ohio
SECRETARY—Corliss W. Powell, 321 Brooklyn Ave., Dayton, Ohio
TREASURER—William Durnbaugh, R. R. No. 4, Xenia, Ohio

COMMITTEE CHAIRMEN

Publicity—Wm. J. Wise, 601 Oxford Ave., Dayton, Ohio
Educational—H. C. Luechauer, 19 Stockton Ave., Dayton, Ohio
Exhibits — G. Lewis Smith, 618 McKaig Ave,. Troy, Ohio
Program—Corliss W. Powell, 321 Brooklyn Ave., Dayton, Ohio
Banquet and Entertainment—E. W. Cochran, 921 Rosedale Drive, Dayton, Ohio
Registration — Leon L. Haas, 64 Markison Ave., Columbus, Ohio
Recreation—Edison C. Sickman, 259 Aberdeen Ave., Dayton, Ohio
Plant Visitation—Fred Berner, Coolidge and Hadley Road, Dayton, Ohio
Hotel Reservations—Robert B. Skinner, 2603 Shafer Blvd., Dayton, Ohio
Transportation—Clarence Folz, 1009 Haynes St., Dayton, Ohio
Advisory—Walter Fraine, 507 Grand Ave., Dayton, Ohio

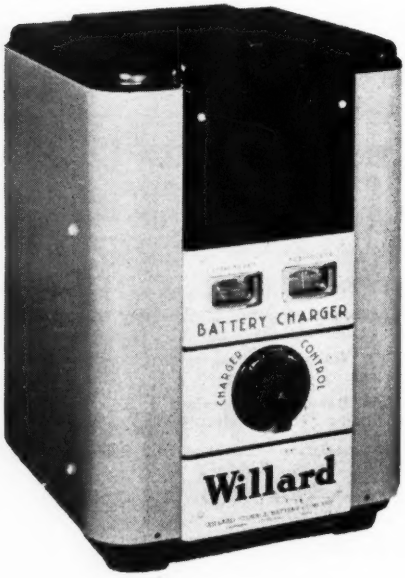
Finishes THAT AID IN APPEARANCE AND UTILITY

(Right)—The crinkle enamel finish on this beautifully designed electric fan is resistant to wear and abrasion.



(Photo Courtesy Wagner Electric Corp.)

(Photo Courtesy Designers for Industry, Inc.)



(Left) — The front panels on this battery testing and charging unit are chromium plated. Other parts of the cabinet are finished in a baked, gloss enamel which gives a particularly rich effect for a quality product.

(Photo Courtesy Modern Packaging)

(Left) — Attractive lithographed coats are applied to this new "visible canning" package.

(Photo Courtesy Harold Van Doren and Associates)

(Right) — The smooth, one-piece body of this Maytag washing unit is of one-piece cast-aluminum construction. A white, permanent enamel finish is applied to the outside of the unit.

News OF THE INDUSTRY

Hanson-Van Winkle-Munning Company Adds to Staff

Ellsworth F. Wilson has been appointed to the engineering department of the Hanson-Van Winkle-Munning Company, Matawan, N. J., manufacturer of electroplating equipment and supplies.

Harvey K. Hunt, formerly of the Crucible Steel Company, has joined the laboratory staff.

H. E. Moyer has been appointed sales representative.

W. W. Wieland has been appointed sales engineer.

Jack D. Clayton has been appointed sales representative. He will be located in the company's Detroit office at 2842 W. Grand Blvd., Detroit, Michigan.

Harold R. Smallman, who has been for a number of years in charge of the Chicago office of the Hanson-Van Winkle-Munning Company, has been appointed western manager.

Watson-Standard Appoints New York Representative

The Watson-Standard Company, 235 Galveston St., Pittsburgh, Pa., has appointed Technical Paint Products Company as its metropolitan New York representative.

The Technical Paint Products Company will handle not only the industrial and trade sales, but also the Watson-Standard industrial finishes and product finishes.

American Asphalt Paint Company Purchases Casein Paint

Grover M. Hermann, president of the American Asphalt Paint Company, 43 E. Ohio St., Chicago, Ill., has just announced the purchase of the Casein Paint Division of the Beatrice Creamery Company.

Casino Paint is the brand name established two years ago for this casein paint. The name and entire distribution set-up will be carried on by the new owners.

Manufacture of Casino Paint has already been started at the Kankakee plant of the American Asphalt Paint Company, who also operate plants at Lincoln, N. J.; Marietta, Ohio; and High Point, N. C. Mr. Hermann states that service to Casino customers will not be interrupted and because of strategically located plants should be materially improved.

Sales of Casino Paint are to be under the direct supervision of J. G. Brown, vice-president, who is in charge of the present Casein Division of the American Asphalt Company.

Midwestern Wyandotte Managers Hold Convention

Ten of the 26 divisional and territorial managers of The J. B. Ford Sales Company recently met at the Columbia Club in Indianapolis for a two-day discussion of the many cleaning and washing

Midwestern Wyandotte Managers Who Attended Regional Convention

problems which are solved with the use of Wyandotte Products. Reading from left to right, there is shown above G. T. Robinson, Central Division Manager and Manager of Cleveland territory; H. L. Priest, Detroit; F. S. DuGray, Grand Rapids; C. W. Troxell, Cincinnati; E. L. Mead, Buffalo; Gail Eldridge, Indianapolis; E. F. Venard, Pittsburgh; W. C. Dizney, St. Louis; J. P. Robinson, Louisville, and J. A. Crowley, Mid-Western Division Manager and manager of Chicago Territory.

Millspaugh Joins Bias Buff & Wheel Company, Inc.

Mr. George M. Millspaugh, formerly with The Lacquer & Chemical Corporation of New York as sales representative, has become associated with The Bias Buff & Wheel Company, Inc., 430 Communipaw Ave., Jersey City, N. J., in the capacity of sales representative for part of Connecticut, Massachusetts, and Rhode Island.

Mr. Millspaugh has had 10 years practical experience with the Seth Thomas Clock Company, Thomaston, Conn., where he was in charge of all metal finishing, buffing, plating, lacquering, and so on.

This knowledge of the finishing field will prove of intense value to him in his new connection, especially in an advisory capacity among users of buffs and polishing materials.

Charles Arthur White Passes

Charles Arthur White, secretary-treasurer of Leeds and Northrup Co., 4901 Stenton Ave., Philadelphia, Pa., passed away at Germantown Hospital, Philadelphia, after a two weeks' illness. He was fifty-eight years old. His wife, the former Grace Myers, and his son, Charles, Jr., survive.

Mr. White was born near Poughkeepsie, N. Y., was associated with Adriance Platt & Co., manufacturers of farm machinery, from 1902 to 1914, and from 1915 to 1920 was cost accountant, later purchasing agent, of the Hero Manufacturing Co., Philadelphia.

He joined the Leeds and Northrup Co. as chief accountant in 1920, soon accepted the responsibilities of an expanding accounting department, and by 1928 was secretary-treasurer. He was past president of the Rotary Club of Philadelphia, and for many years was active in Philadelphia in the work of the Presbyterian Church and the Y. M. C. A.

Porcelain Enamel Institute Committee Discusses Term "Porcelain"

The executive committee of the Porcelain Enamel Institute met recently to consider the increasing use of the term "porcelain" by various manufacturers in the appliance field to describe the finish on their products. Numerous instances were cited of large appliance manufacturers who had, for years, described the porcelain enamel finish on their products as simply "porcelain" or "porcelain on steel" or "porcelain-lined." This committee decided that such an abbreviation of the description of this finish was in no way confusing to the buying public at the present time.

As representatives of the industry, this group was strongly in favor of continuing the interchangeable usage of the terms "porcelain" and "porcelain enamel" when applied to products which are technically described as a vitreous

or glassy finish applied to a metal shape. It was unanimously agreed that the terms "porcelain" and "porcelain enamel" could fairly be used in an interchangeable manner on refrigerators, stoves and ranges, oil heaters, washing machines, table tops, signs, architectural parts and bathroom and kitchen fixtures. The buying public has so long associated the terms "porcelain" and "porcelain enamel" with this type of product, that no possible misunderstanding could be entertained in the mind of the average individual when such terms are used.

The executive committee instructed the managing director of the institute, Charles S. Pearce, to immediately confer with manufacturers within the industry in an effort to clearly establish the proper use of these descriptive terms, so that no doubt would arise in the public mind as to what constitutes genuine porcelain enamel.

Iron and Steel Credit Executives To Hold Annual Meeting

Credit executives of the Iron and Steel Industry will gather at the Royal York Hotel in Toronto, Canada, May 19th to 23rd to attend the Forty-fifth Annual Credit Congress. This is the first international congress to be held by the National Association of Credit Men's Trust Association, Ltd., 137 Wellington, W., Toronto, Canada. This year, the credit congress will be international in scope, since the membership of the Canadian Credit Men's Trust Association, Ltd. will be active participants.

The credit congress will be attended by several thousand delegates and credit executives, representing all branches of industry. Topics and problems of interest to business, as a whole, will be ably presented at the general sessions.

Lightcap Appointed Manager Devoe & Raynolds Maintenance Division

Mr. M. W. Lightcap, formerly with Pittsburgh Plate Glass Company, has been appointed manager of maintenance sales for the Devoe & Raynolds Company, 1 West 47th St., New York, N. Y., according to an announcement made recently by Mr. E. S. Phillips, president.

He will make his headquarters in New York.

Mr. Lightcap was associated with Pittsburgh for the past 15 years, engaged, for the largest part of that time in paint sales and maintenance work. He helped organize that company's paint mantenance service department,

M. W. Lightcap

of which he was supervisor for the past five years.

He has a wide acquaintance among building maintenance engineers in many industries, particularly textiles, iron and steel, petroleum, food, cereal, milling and public utilities, as well as in the insurance, office building, apartment house and hotel fields.

Hommel Speaks to Eastern Enamelers Club

At a meeting of the Eastern Enamelers Club, held on February 17th, at the Benjamin Franklin Hotel, Philadelphia, Pa., Mr. Oscar Hommel, president of the O. Hommel Co., 209 Fourth Ave., Pittsburgh, Pa., delivered a very informative discourse to the members of that club. The subject of Mr. Hommel's talk was "Fifty Years of Growth in the Enameling Industry."

Mr. Hommel reviewed the numerous enamel developments that have taken place during his 50 years of serving the ceramic industry. Materials, formulae, processes, decorations and porcelain en-

amel markets were all included in the scope of Mr. Hommel's talk.

Special tribute was paid the steel industry for the remarkable progressive strides made in the development of a suitable enameling steel for speedier porcelain production.

In concluding his address, Mr. Hommel enthusiastically pointed out the many new markets now open to porcelain enamel, and optimistically hoped that the next 50 years will far surpass the developments of the last half century.

Chapman Appointed Representative of Hays Corporation

The Hays Corporation, Michigan City, Ind., manufacturers of combustion instruments and automatic combustion control, announces the appointment of Charles M. Chapman, of Cincinnati, as their representative covering southern Ohio and contiguous territory in Kentucky and Indiana. Mr. Chapman is already on the job, having established headquarters in the Schmidt Building.

The United States Stoneware Co. Celebrates 75th Anniversary

April, 1940, marks the 75th business year of The United States Stoneware Co., 60 E. 42nd St., New York, N. Y. This company was incorporated in 1865. The original factory consisted of one small kiln producing simple items. Today, this company operates one of the most modern plants with well organized research and engineering departments.

The United States Stoneware Co. manufactures a complete line of ceramic and corrosion-proof chemical equipment. A new machine shop building is now being erected to house the machine manufacturing division. This division manufactures centrifugal acid pumps, exhausters, mixers, jar mills, etching machines, and so on. Another new building in the course of construction is to be used for the manufacture of tank lining material.

Rochester Chapter A. E. S. to Hold Annual Educational Session and Dinner Dance

The 20th Annual Educational Session and Dinner Dance of the Rochester Chapter, American Electroplaters' Society will be held at the Seneca Hotel, Rochester, N. Y., on Saturday, April 27, 1940. Speakers, together with the topics to be discussed, and the time the papers will be delivered, are as follows:

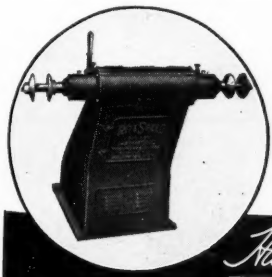
1:00 P. M.—Mr. Frank Henry, Chemist of the Rochester Gas & Electric Corp.
Topic—"Water."

2:00 P. M.—Mr. Raymond F. Yates, Vice President, Krome-Alume Corp.
Topic—"Plating of Aluminum and Its Alloys According to the Krome-Alume Process."

3:00 P. M. — Dr. D. A. Cotton, Chief Chemist, Delco-Remy Div. General Motors Co. at Anderson, Ind.
Topic—"Chrome Plating of Dies and Gages."

7:00 P. M.—Banquet, Seneca Hotel Ballroom.
Dancing — Floorshow.

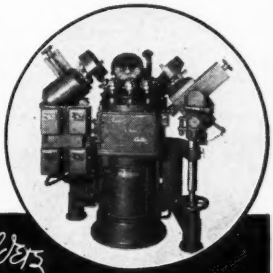
Tickets for the occasion are $2.50 per person. Tickets can be obtained by writing Judson R. Elster, 176½ Fulton Ave., Rochester, N. Y.



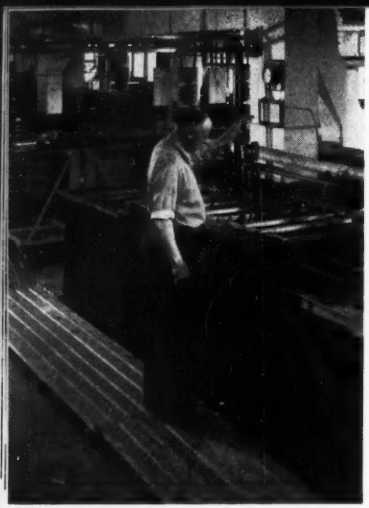
HAMMOND of KALAMAZOO
POLISHING MACHINES

POLISHING LATHES ★ . . . Ask for Catalog No. 10.

AUTOMATICS ★ . . . Rotary and Strait-Line. Send samples for prices and approximate production figures.



Hammond Machinery Builders INCORPORATED
NEW YORK 1622 Douglas Ave., KALAMAZOO, MICH. CHICAGO



New PLANT EQUIPMENT AND Materials

Hommel Ground Coat

The O. Hommel Company, 209 Fourth Ave., Pittsburgh, Pa., ceramic suppliers, has announced the development of a blue ground coat. The Hommel blue ground coat is said to have a remarkably wide firing range, and will produce a smooth, satiny finish without excessive gloss. The ground coat is said to be ideal for thin cover coat applications.

According to the manufacturer, the Hommel blue ground coat will not burn off at the edges and will eliminate blistering caused by defective steel. The material will cover the most difficult shapes with ease.

Grainlock Polishing Wheel

Industrial Lubricants Co., Inc., 5736 12th St., Detroit, Mich., has placed on the market a polishing wheel to be known as "Grainlock." This wheel is said to be constructed with the use of Grainlock cement.

In the Grainlock Polishing Wheel construction, individual buff sections are permanently fastened with Grainlock cement. This type of construction

Grainlock Polishing Wheel

is said to enable the wheel to stand up even under high temperatures. The dan-

WRITE FOR LATEST CATALOGUE ON
NEW LOW COST PLATING
with HOBART Electroplating Equipment
HOBART BROS. CO., Box PF-340 Troy, Ohio, U.S.A.

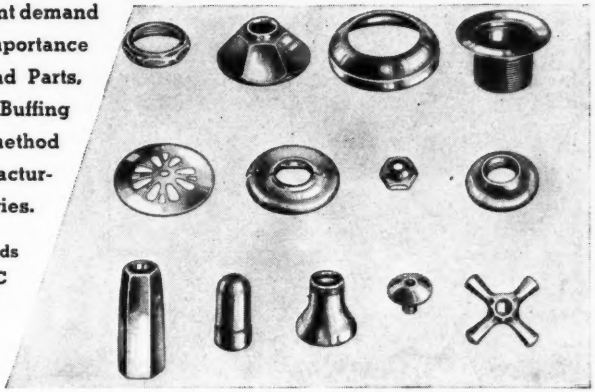
INCREASE production..CUT costs

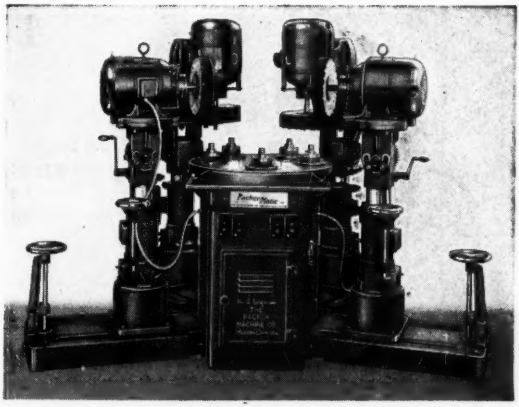
Packer-Matic

Automatic POLISHING & BUFFING MACHINES

● Today, with the constant demand on Production and the importance of Finish on Products and Parts, Automatic Polishing and Buffing is the most efficient method used by leading manufacturers in all types of industries.

EXAMPLE: Plumbing Goods Mfgrs. find PACKER - MATIC the solution to the Finishing problem — More Production and Cutting Costs.





● PACKER-MATIC Polishes and Buffs parts of various sizes and shapes with equal efficiency and *Automatically.* PACKER - MATIC is made in Rotary, Straight Line Conveyor and Roll types. The Rotary type, No. 4, shown.

INTERESTED? Send sample Part or Blueprint for a Factory Proven "Time Study" and learn how you can Increase Production and Cut Costs on your Finishing. No obligation—WRITE to "Time Study" Department.

Pioneer Builders of Automatic Polishing and Buffing Machines

THE PACKER MACHINE CO. MERIDEN, CONN., U.S.A.

ger of wheel burning is minimized because the Grainlock cement between the sections serves as a fire wall.

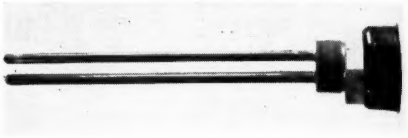
Maximum efficiency, long life, and trouble-free operation are the outstanding features of Grainlock wheels.

Westinghouse Immersion Heaters

Two types of immersion heaters designed specifically for heating alkaline cleaning solutions have been placed on the market by Westinghouse Electric & Manufacturing Co., Mansfield, Ohio. The terminal boxes on these heaters have been changed to condulet boxes which are said to greatly simplify the wiring problem.

The immersion heaters are available as circulating, and non-circulating heaters.

The non-circulating heater is designed for tanks or baths requiring little or no circulation. The heating tubes range from 14 to 37 in. in length with a rating of from 1 to 3 kw's. These units are said to meet conditions where solutions cannot be circulated at low temperatures because of slow heat absorption.

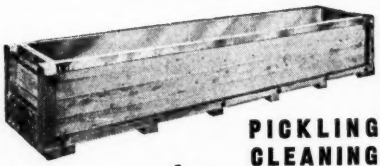


Westinghouse Immersion Heaters

The circulating heater is designed for applications where the solution circu-

for
RADIANT ENERGY DRYING
NALCO DRITHERM
(INFRA-RED RAY)
CARBON LAMPS
Cut drying costs . . . Save time . . . Use minimum space . . . Get uniform results
Write for information and prices today.
NORTH AMERICAN ELEC. LAMP CO.
1020 TYLER STREET ST. LOUIS, MO.

R-700
An unusual Rust Inhibitive.
Dries with lacquer speed.
Very flexible baking schedule.
Resists salt spray remarkably.
Very light in color.
Ideal vehicle for bronze powders and pastes.
Suggested wherever RUST is a production problem.
Remarkably adherent as primer under baked finishes.
Variations for special requirements available.
Our pamphlet will be gladly sent on request.
The Varnish Products Co.
5208 HARVARD AVENUE
CLEVELAND, OHIO

TANKS

PICKLING
CLEANING
for **PLATING**
Any size or style of wooden tank. Scientifically constructed. Plain, lead, or rubber lined.
WRITE FOR LITERATURE.
G. WOOLFORD
WOOD TANK MFG. CO.
DARBY PENNSYLVANIA
SINCE 1854

lates at a sufficient rate to absorb the heat and prevent excess heater tube temperatures. The heater tubes range from 32½ to 37 in. in length with a rating of from 5 to 8 kw's.

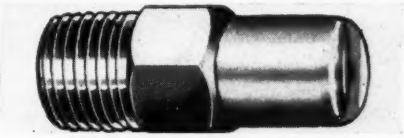
The watts density of the circulating heater is approximately twice that of the non-circulating unit. Both the circulating and non-circulating immersion heaters are designed with low watt density per square inch of heating surface.

Spraying Systems Type "U' Flat Spray Nozzle

The illustration herewith shows a flat spray nozzle designated as the Type "U," which has been placed on the market by Spraying Systems Co., 4021 W. Lake St., Chicago, Illinois.

The spray obtained by this type of nozzle is of the flat type with a slightly heavy center.

The Type U is available with a number of spray angles. This type of nozzle is equipped with ¼-in. male pipe connection. The capacities are said to range from 1.5 to 3.5 G.P.M. at 10 lbs. pressure and 3 to 7 G.P.M. at 40 lbs.



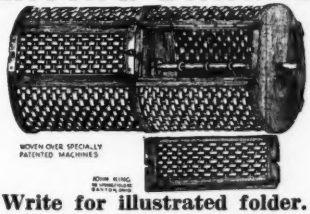
Spraying Systems Type "U" Flat Spray Nozzle

pressure.

The standard stock construction of the

WE RECOVER YOUR
SOLVENTS and THINNERS
from Sludge, Waste, Wash,
Spoiled Lacquers, etc.
AND SAVE YOU MONEY
Each shipment—one drum or a carload—receives PROPER and SEPARATE TREATMENT.
Write to:
SOLVENTS RECOVERY SERVICE, Inc.
LISTER AVE. & BROWN ST., NEWARK, N. J.
or
HAMMOND CHEMICAL SERVICE, Inc.
241 BRUNSWICK ST., HAMMOND, IND.

KING

PLATING BARRELS

Write for illustrated folder.
Use them once—you'll use them always
JOHN KING
48 SPRINGFIELD ST., DAYTON, OHIO

The standard of quality for forty-eight years.

HARSHAW ANODES AND CHEMICALS
THE HARSHAW CHEMICAL CO.
Cleveland, Ohio and principal cities

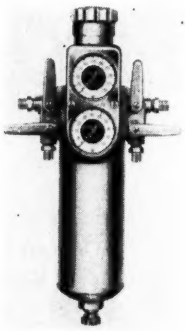
Type U Spray Nozzle is brass or iron. Other metals are available upon specications. The Type U Nozzle is recommended for metal cleaning and processing, industrial washing machines, or wherever spray patterns are required to overlap and spray flat with a heavy center.

DeVilbiss Type "HLC" Air Transformer

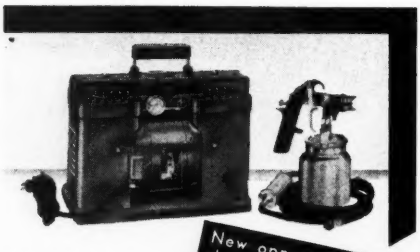
An air transformer designated as the Type "HLC" has been placed on the market by The DeVilbiss Company, 300 Phillips Ave., Toledo, Ohio. This air transformer is said to be radically modern in its streamlined design and an outstanding development in equipment for spray-painting processes.

The Type HLC Transformer provides the spray gun with clean, moisture-free air at a uniform regulated pressure. The transformer has been designed to insure effective and economical operation by means of increased capacity, improved filtering facilities and more sensitive regulation and control of pressure.

According to the manufacturer, the Type HLC Air Transformer has a maximum air capacity. The unit is designed to handle in excess of 50 cubic feet of air per minute, with a minimum of pressure drop. It is designed to pass ample air for two production spray guns



DeVilbiss Type "HLC" Air Transformer



Unmatched Speed
New Features
Lower Prices

New opportunities for shortcuts and savings in finishing operations are yours with one of the new AIRFLOS. Write today for illustrated catalog.
CROWN SPRAY GUN MFG. CO.
1218 Venice Blvd., LOS ANGELES, CAL.

TEN NEW Airflo PORTABLE PAINTING OUTFITS
Warehouses in Principal Cities

Borolon
TRADE MARK
First quality aluminum oxide abrasive grain manufactured in our own electric furnace plant under strictest standards of quality and uniformity. Available in four types (CT, T, B, TB), each of which is most efficient for polishing work within its field of application. Write for Abrasive Grain Data Sheet No. 1 giving complete details. Samples sent of grain sizes you specify.
POLISHING GRAIN

ABRASIVE COMPANY
Division of Simonds Saw and Steel Company
Tacony & Fraley Streets · Philadelphia, Pa.
Chicago Branch: 1624 South Western Ave.

in continuous and simultaneous operation and for three spray guns in ordinary, intermittant production.

Constructional features include a large synthetic rubber regulator diaphragm, refined operation mechanism, and a large, conveniently located regulator knob. These features are said to enable the operator to obtain a finer degree of sensitivity in pressure regulation and positive control of pressure. A large condensing chamber offers greater air expansion and thorough condensation of moisture. Effectiveness in air cleaning is accomplished by improved baffle arrangement. A unique mechanical filtering device provides continuous filtering efficiency without wear or attention. A metal filter, wholly mechanical, is said to eliminate the necessity of renewing cotton waste packed filters.

The cylinder of the Type HLC Air Transformer is chromium plated and highly polished to prevent the accumulation of dust, dirt and paint so that the exterior of the equipment is easy to keep clean. The pressure gauges of the unit are enclosed in the die cast body of the transformer.

Autovent "V"-Belt Drive Unit Blower

A "V"-Belt Drive Unit Blower has been placed on the market by Autovent Fan & Blower Co., 1807 N. Kostner Ave., Chicago, Ill. This unit can be set up for almost any motor combination, which in turn makes it possible to meet any desired performance. Adjustments can be made on the job and replacements can be obtained from stock, since standard equipment is used throughout.

METAL BASKETS
of all kinds

Specialists in manufacturing of cleaning baskets where air circulation and drainage are the essential features. Fabricated from any metal, in any style, size or shape for industrial requirements, such as cleaning, plating, finishing, pickling, *heat treating*, etc. Write for catalog.

THE CARPENTER METAL PROD. CO.
445 EAST 131 ST. • CLEVELAND, O.

"MAGIC" TACK RAGS
IMPROVE YOUR FINISH 100%

MAGIC TACK RAGS remove specks, lint and sand particles--- bring out that deep, smooth luster, produce a faultless surface for white or colored finish. Why use "home made" tack rags when you can buy MAGIC TACK RAGS at trifling cost! They are tackier, do not dry--- are dust-proof and spontaneous combustion proof. Packed in dozen and gross lots or more. Made only by the

Wm. A. Juergens Co.
4036-40 Lagrange Street,
Toledo, Ohio, U. S. A.
If your dealer does not carry Magic Tack Rags, write us for sample.

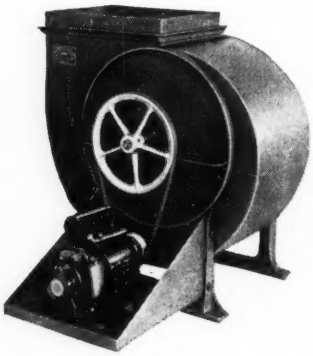
D'OILENE "A"
The Perfect Degreasing Solvent

"D'OILERS"
Are Built to Solve Your
DEGREASING PROBLEM
PLEASING IN APPEARANCE WITH UP TO THE MINUTE FEATURES BUILT INTO THEM

Mechanical Process Corp.
SOUTH ORANGE, N. J.

Specialists in the use and handling of chlorinated solvents . . .

The Autovent V-Belt Drive Unit Blower is said to require minimum space. A universal dischange feature is



Autovent "V"-Belt Drive Unit Blower

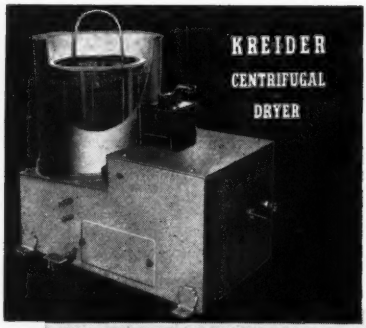
said to permit the change of nozzle position when necessary. The units are available in wheel diameters ranging from 12½ in. to 25 in.

Torit Dust Collector

A self-contained dust collecting unit of sturdy, compact and portable design, to be known as the Torit Dust Collector, has been placed on the market by Torit Mfg. Co., 283 Walnut St., St. Paul, Minn., for use in carrying dust-laden air away from polishing and grinding wheels.

In operation, dust-laden air is drawn from hoods surrounding the polishing or grinding wheels down through a compartment behind a totally-enclosed, dust-proof motor in the cabinets, and then up through a series of chemically-treated, spark-resistant cloth filter bags. Heavy particles fall into a tray beneath the bag, while lighter particles adhere to the outside of the filter bags. The filtered air passes through the motor chamber above the filter bags and then out of an exhaust vent on top of the cabinet into the room — or it may be piped outside, if desired. Foot manipulation of a lever located outside the cabinet shakes the filter bags and helps remove dust and dirt from them.

The manufacturer states that the Torit Dust Collector is silent in operation and can be economically and easily



For Drying Plated Work and Lacquering Small Parts

One operator speeds up and improves production. Fast and economical.

All steel and electric welded. Fully enclosed ¾ H.P. motor. Reversing drum switch. Foot brake. V-belt drive. Basket rotates at 625 r.p.m. 32" x 16" floor space. Steam or gas unit heater optional equipment.

Write for details

DELLINGER MFG. CO.

729 N. PRINCE ST. • LANCASTER, PA.

The ROBERTS WAY

Means Better Finishes, Uniformly Produced At Less Cost.

Though attractively priced, ROBERTS ROUGES and BUFFING COMPOUNDS are unsurpassed in sustained high standard quality and contain no silica or other health menacing ingredients.

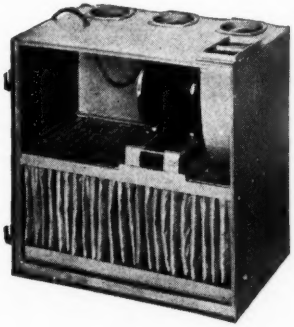
Please state your finishing requirements and samples to apply will be promptly sent at no charge.

THE ROBERTS ROUGE CO.

904 Longbrook Ave., Stratford, Conn.

Specialists in manufacturing of gold, sterling, and silver plate rouges; stainless steel, chrome, and crocus compounds.

installed in various departments of factories, laboratories, small shops, and so on, wherever grinding, polishing, or buffing wheels are used. This unit can also be used for special grinding and polishing operations where central suction systems are already installed. The Torit Dust Collector is available in three sizes having capacities of from 150 to 600 c.f.m., designed to gather dust from wheels up to 16 in. in diameter.



Torit Dust Collector

Gold Seal Laboratory Inks

A glass marking ink for labeling small glass surfaces and containers, to be known as "Gold Seal," is now being marketed by the Clay-Adams Company, 44 E. 23rd St., New York, N. Y. Gold Seal Ink is prepared ready for use with steel pen, brush, or rubber stamp.

Gold Seal Ink is said to be non-acid, non-corrosive, non-inflammable, and resistant to acid, alkali, solvents, and high temperatures. This type of marking ink is also recommended for porcelain refractories and other ceramic materials. Gold Seal Ink is available in red, white, blue, and black.

Corrosion Resistant Nozzle

The illustration herewith shows a "Whirljet" non-clogging spray nozzle which has been placed on the market by Spraying Systems Co., 4015-21 W. Lake

HOW TO
Prepare Metals for Painting

DEOXIDINE cleans and prepares metal surfaces perfectly for painting. Neutralizes rust-producers.

LITHOFORM No. 2 keeps paint intact and lustrous on zinc and cadmium surfaces.

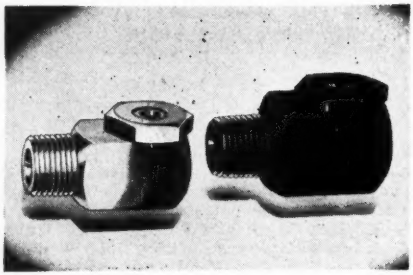
Write for bulletins.

AMERICAN CHEMICAL PAINT CO.
Box 303, Ambler, Penna.

INDIAN BRAND Emery
"INDIAN BRAND" Turkish and Naxos Emery
"HECCO BRAND" American Emery

ABSOLUTE UNIFORMITY
HIGHEST QUALITY
LONGER WEAR
PROMPT DELIVERY
GREATER CAPILLARITY
Write for trial lot.

HAMILTON
EMERY & CORUNDUM CO.
CHESTER • MASS.



Corrosion Resistant Nozzles

St., Chicago, Ill. This nozzle is available in brass, iron, hardened steel, stainless steel, monel metal, lead, and hard rubber. The pipe connection is ⅜ in. male and capacities range from 0.5 to 2.5 g.p.m. at ten pounds pressure.

The Whirljet nozzle is said to produce a hollow cone spray with uniform distribution. The units are of sturdy construction and have large passages which make them practically clog proof. The nozzle is available for use in various industrial and chemical processes, as well as air conditioning.

Horn Low Bake Speedbake

A mar-proof finish which is said to dry in lacquer time, to be known as "Low Bake Speedbake" is being marketed by A. C. Horn Co., Long Island City, N. Y. This finish is said to bake hard when subjected to a temperature of 200 degs. F. for 15 minutes. According to the manufacturer, there is practically no discoloration when baked, and white or pastel colors do not turn yellow. Conventional type ovens may be used in the baking of this finish.

Horn Low Bake Speedbake is said to have tenacity and adhesion even when applied to soft metals and plated metals. The finish is tough, elastic, and mar-resistant. It is said to resist corrosion, weak acids, alkalis, grease, oil, and alcohol.

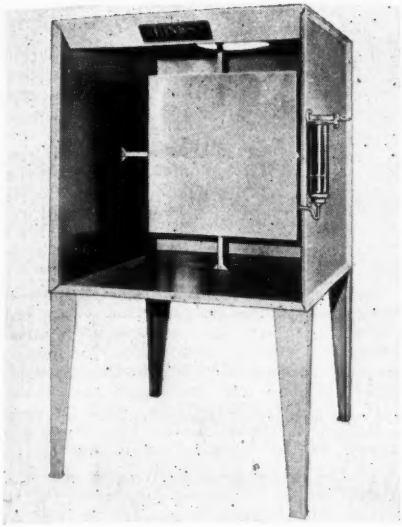
Binks New Roche Spray Booth

A spray booth designed for small manufacturers who require small, inex-

THE ADIRONDACKS GORE MOUNTAIN CRYSTAL GARNET ORE
ABRASIVE GARNET
World's Standard for Over 60 Years
FOR
Abrasive Paper and Cloth
Grinding Wheels
Sand Blast
Lithographing
Non-Skid Surfaces
Wearing Surfaces
Ornamental Purposes
Minus 300 Mesh For Polishing
BARTON MINES CORPORATION
NORTH CREEK, WARREN COUNTY, N.Y.

SKYBRYTE
Aluminum Waxes
• For plain or anodic surfaces. For production or maintenance. Beautify and protect all bright surfaces. Write for samples.
THE SKYBRYTE CO.
CLEVELAND, OHIO

For a real good polishing job use
KEYSTONE EMERY
TURKISH — NAXOS — AMERICAN
KEYSTONE EMERY MILLS Write for Sample 4316 Paul St., Phila, Pa.



Binks New Roche Spray Booth

pensive spray booths has been placed on the market by Binks Manufacturing Co., 3114-40 Carroll Ave., Chicago, Ill. This booth has been designated as the "New Roche."

The New Roche Booth is available in one standard size only, with width, height, and depth being 3 ft. 6 in. each. All panels are interchangeable so that an exhaust fan can be operated out of the top, side, or back of the booth, as desired.

A line of 15-in. diameter exhaust fans has been designed for use with the New Roche Spray Booth. The booth is available without legs, or with legs 31 in. long.

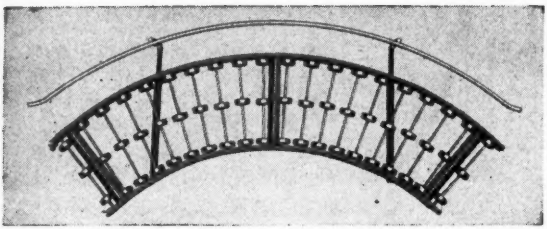
Metzgar 8-Ft. 90-Deg. Conveyor Curve

To accommodate a wider sweep than can be accomplished by the use of its standard 5-ft. 90-deg. curve, the Metzgar Company, 112 Logan St. S. W., Grand Rapids, Mich., has added the 8-ft. 90-deg. curve illustrated herewith to its wheel type conveyor. Like the 5-ft. curve, this

RUST-I-CIDE "50"
Cleans, etches, and prepares metal for a perfect finishing job.
It can help your product.
RUSTICIDE PRODUCTS CO.
3125 Perkins Ave. • Cleveland, Ohio

AA QUALITY ABRASIVES
QUALITY ABRASIVES FOR POLISHING AND BURNISHING
ALUMINUM OXIDE
SILICON CARBIDE
CORUNDUM
TURKISH EMERY
Selected ores carefully cleaned and graded to give you better polishing and burnishing performance.
For attractive prices and prompt service write to—
AMERICAN ABRASIVE COMPANY
WESTFIELD • MASSACHUSETTS

Every BUFF Made to Your Order
Deliveries on Schedule
MIDWEST BUFFS
USE MIDWEST
E. 79th ST. & PLATT AVE. CLEVELAND OHIO



Metzgar 8-Foot 90-Degree Conveyor Curve

section of conveyor equipment consists of oilless dust-proof wheels and sturdy hot-rolled channel members, and has an all arc-welded construction.

According to the manufacturer, straight lengths can be coupled to the 8-ft. curve at a 40-deg. angle and loads moved safely without guide rails. Where speed of travel is great, or the turn must be sharper than 40 deg., a curve rail as shown in the illustration is necessary. This rail is adjustable to various widths of work conveyed.

"Gibsiloy" Electrical Contacts

Electrical contacts which are said to possess the high conductivity of pure silver as well as low, constant resistance are now being marketed by the Gibson Electric Co., 537 Boulevard of the Allies, Pittsburgh, Pa., under the trade name of "Gibsiloy."

Because of its ductility, Gibsiloy—a powdered metal composition — can be formed into a wide variety of shapes. Moreover, it may be punched, machined, drilled, tapped, or otherwise worked. Some of the many shapes available, both of solid Gibsiloy and with Gibsiloy attached to base metal backings, are shown in the illustration herewith.

Gibsiloy Electrical Contacts are said to be extremely hard and resistant to wear. Hardnesses range from that of pure silver to 200 Brinell B Scale Shore

MAILING LISTS

GET OUR FREE REFERENCE BOOK and MAILING LIST CATALOG FREE

Gives counts and prices on accurate guaranteed mailing lists of all classes of business enterprises in the U. S. Wholesalers—Retailers—Manufacturers by classification and state. Also hundreds of selections of individuals such as professional men, auto owners, income lists, etc.

Write today for your copy

R. L. POLK & CO.
Polk Bldg.—Detroit, Mich.
Branches in Principal Cities
World's Largest City Directory Publishers
Mailing List Compilers. Business Statistics. Producers of Direct Mail Advertising.

CHECK IN AT DE WITT OPERATED HOTELS

In Cleveland
HOTEL HOLLENDEN

In Columbus
THE NEIL HOUSE

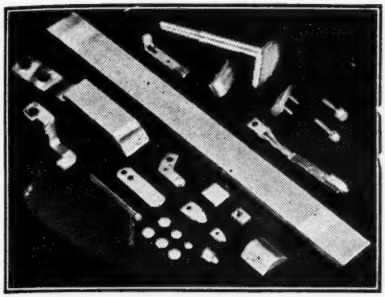
In Akron
THE MAYFLOWER

In Jamestown, N. Y.
THE SAMUELS
and
THE JAMESTOWN

In Corning, N. Y.
BARON STEUBEN HOTEL

DeWITT OPERATED HOTELS

Theo. De Witt, Pres. R. F. Marsh, Vice Pres.



"Gibsiloy" Electrical Contacts

Scleroscope for some grades of silver-nickel-tungsten. The contacts are claimed to be free from galling, and their high arc resistance greatly reduces welding or sticking. The most common forms of Gibsiloy include silver-nickel, silver - nickel - cadmium, silver - nickel - tungsten, silver-nickel-molybdenum, silver - tungsten, and silver - molybdenum. Each form is produced in different grades possessing various physical properties. Certain forms, particularly silver-nickel-cadmium, are said to greatly reduce transfer of metal from one contact to another on D.C. circuits.

Mention PRODUCTS FINISHING when writing to advertisers. Your cooperation will be appreciated both by the advertiser and this magazine.

OPPORTUNITY SECTION

FOR SALE

INDUSTRIAL WASHING MACHINE
Used Only Two Weeks
18x24" Working Heighth and Width
27' 6" Overall Length
For Details—Address Box 16, PRODUCTS FINISHING, 431 Main Street, Cincinnati, Ohio.

FOR SALE

Guaranteed DeVilbiss Reconditioned Guns
Booths—Fans—Transformers
DeVilbiss Distributors
HOVEY SPRAY EQUIPMENT CO.
1509 Spring Garden St. Philadelphia, Pa.

THIS Opportunity Section is available for classified advertisements featuring equipment, employment, business opportunities, etc., in the industries devoted to the cleaning, plating, polishing and finishing of metals. For advertising rates and other information address:

PRODUCTS FINISHING
431 Main Street • Cincinnati, Ohio

BARGAIN

IN PLATING GENERATORS
1250/625 amp. 6/12 volt H. & V. W.
750/375 amp. 6/12 volt H. & V. W.
400/200 amp. 6/12 volt H. & V. W.
300 amp. 3 volt Elec. Prod. vertical motor drive.
200 amp. 7½ volt Hobart, motor drive.
200 amp. 6 volt Electric Products, motor drive.
150 amp. 6 volt Connecticut.
150/75 amp. 7½-15 volt Eager, motor drive.
50 amp. 6 volt Leland, single phase motor drive.
Plating generators Bought, Sold, Exchanged. *Write*
THE MOTOR REPAIR & MFG. CO.
1535 Hamilton Ave. Cleveland, Ohio

FOR YOUR *Catalog* LIBRARY

To obtain copies of the catalogs listed here, indicate on the coupon the number of the item in which you are interested and mail as directed.

1. Pemco Porcelain Enamel Frit

A folder describing the advantages of producing enamel frits by automatic methods is now being issued by The Porcelain Enamel Mfg. Co., Eastern and Pemco Aves., Baltimore, Maryland.

2. Chromalox Heating Units

A 64-page catalog describing and illustrating the line of electrical heating units for heat applications up to 1,000 degs. F. is now being issued by Edwin L. Wiegand Co., 7520 Thomas Blvd., Pittsburgh, Pennsylvania.

3. Wrinkle Finishes by Horn

A beautifully illustrated 4-page folder describing Horn wrinkle finishes is now being issued by A. C. Horn Co., 43rd Rd. and 10th St., Long Island City, New York.

4. Plant Conveyors

A 30-page catalog presenting facts and photographs on belt, live roller, apron, and vertical conveyors is now being issued by The Alvey-Ferguson Co., 210 Disney St., Cincinnati, Ohio.

5. Nozzles and Nozzle Accessories

A catalog containing complete information on the line of spraying nozzles and nozzle accessories marketed by Spraying Systems Co., 4015-21 W. Lake St., Chicago, Ill., is now being issued by this company.

6. Industrial Portable Electric Heaters

The electromode industrial portable heater manufactured by The Electric Air Heater Co., Division of The American Foundry Equipment Co., 555 S. Bykrit St., Mishawaka, Ind., is described by a bulletin now being issued by the company.

7. Propeller Fan Catalog

The entire line of Hartzell propeller-type fans and blowers is illustrated in a 32-page catalog designated as No. 12 which is now being issued by Hartzell Propeller Fan Co., 1963 Shroyer Rd., Piqua, Ohio.

8. Production Methods Metal Parts Washing Equipment

A beautifully illustrated 6-page folder describing A-F Industrial Washing Machines is now being issued by The Alvey-Ferguson Company, 200 Disney St., Cincinnati, Ohio.

9. Ventilating By Air Movement

Wagner Electric Corporation, 6400 Plymouth Ave., St. Louis, Mo., is now issuing an 18-page bulletin on air circulating and ventilating equipment, containing a full discussion of where and how to use this type of equipment for both cooling and ventilating purposes.

10. Polymerin-100

A catalog describing Polymerin-100, an industrial finish with exceptionally low-temperature speed baking characteristics, is now being issued by Ault & Wiborg Corporation, 75 Varick St., New York City.

11. Metalprep

A preparation which is said to remove rust, clean metal, destroy rusting agents, assure a bond between paint and metal is described in this folder now being issued by Neilson Chemical Co., 6564 Benson St., Detroit, Michigan.

12. Modern Electroplating Control

Modern electroplating control with Sangamo Amperehour Meters is discussed in an 8-page catalog now being issued by Lasalco, Inc., 2822-38 LaSalle St., St. Louis, Missouri.

13. New Wrinkle Dipspray

A castings finishing process known as "Dipspray" is described and illustrated in this catalog which is now being issued by New Wrinkle, Inc., Mutual Home Bldg., Dayton, Ohio.

14. Paper Masking Tape

A masking tape that is highly resistant to lacquers, paints, and solvents is described in this folder now being issued by Industrial Tape Corporation, New Brunswick, New Jersey.

15. Pickleen

A new addition agent for clean, economical acid pickling to be known as "Pickleen" is described in a 4-page folder now being issued by The Enthone Co., 440 Elm St., New Haven, Conn.

16. Analysis of Plating Solutions

The fifth edition of this booklet describing simple methods of analyzing plating solutions is now being issued by Hanson-Van Winkle-Munning Co., Matawan, New Jersey.

17. Airway Ventilated Buffs

Cool cutting buffs for high speed buffing operations are illustrated and described in a 4-page folder now being distributed by Jackson Buff Corporation, 21-03 41st Ave., Long Island City, New York.

18. Rome Polishing and Buffing Lathes

A catalog describing and illustrating the complete line of standard model polishing and buffing lathes is now being issued by Rome Machinery Sales & Engineering Co., 627 Webster St., Rome, New York.

19. Electrical Heat-Corrosion-Resisting Alloys

A 56-page data book on electrical, heat and corrosion resisting alloys, designated as R-40, is now being issued by Driver-Harris Company, Harrison, New Jersey.

20. Air-Operated Controllers

Modern air-control instruments and their applications are discussed in this catalog which is designated as No. 4050 and is now being issued by The Bristol Company, Waterbury, Connecticut.

21. High Speed Synthetic Enamels

A technical bulletin describing Codur highspeed synthethic enamel finishes is now being issued by Maas & Waldstein Co., 438 Riverside Ave., Newark, New Jersey.

Print plainly in filling out coupon for literature.

PRODUCTS FINISHING
431 Main St., Cincinnati, Ohio

I am interested in receiving the following literature reviewed in your April issue.

No...... **No.**..... **No.**..... **No.**..... **No.**.....
(Insert numbers denoting literature you want.)

Name ..... Title.....

Company .....

Company Address .....

City..... State.....

Index TO ADVERTISEMENTS

Abbott Ball Company, The....51
Abrasive Company....70
Abrasive Products, Inc....4
Alvey-Ferguson Company....23
American Abrasive Company....75
American Air Filter Co., Inc....27
American Chemical Paint Company....73
Atlas Powder Company....8
Atlantic Weka Corporation....54
Barton Mines Corporation....74
Carpenter Metal Products Co....71
Clinton Company, The....53
Columbia Electric Manufacturing Co....39
Crown Spray Gun Mfg. Co....70
Dellinger Manufacturing Co....72
Detroit Rex Products Co....Fourth Cover
DeVilbiss Company, The....17
DeWitt Hotels, Inc....76
Du-Lite Chemical Corp....55
Egyptian Lacquer Mfg. Co....6
Ford Sales Company, The J. B....49
Glidden Company, The....21
Hamilton Emery & Corundum Co., The....73
Hammond Machinery Builders, Inc....65
Harshaw Chemical Co., The....69
Hobart Bros. Co....66
Hovey Spray Equipment Co....77
Industrial Tape Corporation....19
Jackson Buff Corporation....40-41
Juergens Co., Wm. A....71
Keystone Emery Mills....74
King, John....69
Kirk & Blum Mfg. Co., The....37
Maas and Waldstein Company....3
Mahon Company, The R. C....Third Cover
Mechanical Process Corporation....71
Michigan Chrome Company....31
Midwest Buff Manufacturing Co....75
Motor Repair & Mfg. Co., The....77
North American Electric Lamp Co....68
Norton Company....2
Oakite Products, Inc....1
Packer Machine Co., The....67
Pennsylvania Salt Manufacturing Co....25
Polk & Co., R. L....76
Roberts Rouge Co....72
Roxalin Flexible Lacquer Co., Inc....Second Cover
Rusticide Products Company....75
Skilsaw, Inc....29
Skybryte Company, The....74
Solvents Recovery Service Inc....69
Stanley Chemical Co., The....13
Sun Oil Company....47
Udylite Corporation, The....43
Varnish Products Co., The....68
Watson-Standard Co., The....5
Woolford Wood Tank Co., G....68
Zapon Division, The Atlas Powder Co....8

PRODUCTS FINISHING

PUBLISHED BY GARDNER PUBLICATIONS, INC.

431 MAIN STREET • CINCINNATI • OHIO